MGE™ Galaxy™ 5000

20 – 120 kVA

Installation and user manual

APC®
by Schneider Electric

Introduction

Thank you for selecting an APC by Schneider Electric product to protect your electrical equipment.

The **MGE**™ **Galaxy**™ **5000** range has been designed with the utmost care.
We recommend that you take the time to read this manual to take full advantage of the many features of your **UPS**.

APC by Schneider Electric pays great attention to the environmental impact of its products.
Measures that have made **MGE**™ **Galaxy**™ **5000** a reference in environmental protection include:

- the eco-design approach used in product development,
- the elimination of harmonic disturbances reinjected into the AC source,
- production in an ISO 14001 certified factory,
- recycling of the **MGE**™ **Galaxy**™ **5000** at the end of its service life.

To discover the entire range of APC by Schneider Electric products and the options available for the **MGE**™ **Galaxy**™ **5000** range, we invite you to visit our web site, **www.apc.com**, or contact your local APC by Schneider Electric representative.

All products in the **MGE**™ **Galaxy**™ **5000** range are protected by patents. They implement original technology not available to competitors of APC by Schneider Electric.

To take into account evolving standards and technology, equipment may be modified without notice. Indications concerning technical characteristics and dimensions are not binding unless confirmed by APC by Schneider Electric.

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"**MGE**™ **Galaxy**™ **5000** Installation and user manual no. 3400181300".

Safety rules

Safety of persons

The UPS must be installed in a room with restricted access (qualified personnel only, according to standard 62040-1-2).
A UPS has its own internal power source (the battery). Consequently, the power outlets may be energised even if the UPS is disconnected from the AC-power source.

Dangerous voltage levels are present within the UPS. It should be opened exclusively by qualified service personnel.
The UPS must be properly earthed.
The battery supplied with the UPS contains small amounts of toxic materials.
To avoid accidents, the instructions below must be observed.
- **Never operate the UPS if the ambient temperature and relative humidity are higher than the levels specified in the documentation.**
- **Never burn the battery (risk of explosion).**
- **Do not attempt to open the battery (the electrolyte is dangerous for the eyes and skin).**
- **Comply with all applicable regulations for the disposal of the battery.**
- **Caution, wait five minutes before opening the UPS to allow the capacitors to discharge.**
- **Caution, there is high leakage current, the earthing conductor must be connected first.**
- **The product must be installed on a non-inflammable surface (e.g. concrete).**
- **Caution, battery replacement must be carried out by qualified personnel.**

Product safety

A protection circuit breaker must be installed upstream and be easily accessible.
- Never install the UPS near liquids or in an excessively damp environment.
- Never let a liquid or foreign body penetrate inside the UPS.
- Never block the ventilation grates of the UPS.
- Never expose the UPS to direct sunlight or a source of heat.
- When replacing battery cells, use the same type and number of cells.

Special precautions

- The UPS connection instructions contained in this manual must be followed in the indicated order.
- Check that the indications on the rating plate correspond to your AC-power system and to the actual electrical consumption of all the equipment to be connected to the UPS.
- If the UPS must be stored prior to installation, storage must be in a dry place.
- The admissible storage temperature range is -25° C to +45° C.
- If the UPS remains de-energised for a long period, we recommend that you energise the UPS for a period of 24 hours, at least once every month. This charges the battery, thus avoiding possible irreversible damage.
- The UPS is designed for normal climatic and environmental operating conditions concerning the altitude, ambient operating temperature, relative humidity and ambient transport and storage conditions.
- Using the UPS within the given limits guarantees its operation, but may affect the service life of certain components, particularly that of the battery and its autonomy. The maximum storage time of the UPS is limited due to the need to recharge its integrated battery.
- Unusual operating conditions may justify special design or protection measures:

- harmful smoke, dust, abrasive dust,
- humidity, vapour, salt air, bad weather or dripping,
- explosive dust and gas mixture,
- extreme temperature variations,
- bad ventilation,
- conductive or radiant heat from other sources,
- cooling water containing acid or impurities which may cause scale, silt, electrolysis or corrosion of converter parts exposed to water,
- strong electromagnetic fields,
- radioactive levels higher than those of the natural environment,
- fungus, insects, vermin, etc.,
- battery operating conditions.

- **The UPS must always be installed in compliance with:**
- **the requirements of standard IEC 60364-4-42: Protection from thermal effects.**
- **standard IEC 60364-4-41: Protection from electric shock.**
- **standard IEC 60364-4-482: Electrical installations of buildings.**
- **in France, the requirements of standard NFC 15-100.**

Foreword

Pictograms

Document

Danger, these instructions are imperative.

Information, advice, help

Visual indication

Action

Audio signal

LED OFF

LED flashing

LED ON

Earth cables

Other cables

Display

Vertical selection

Other selection

Enter / Confirm

Event scroll in log

Page scroll in log

Fast forward

Forward

Details

Circular menu

Graphical display

Return to previous display

Delete

Access to measurements

Buzzer off

Move up or down one page

Event selection in log by date and time

Increase

Decrease

Save

Alarm

Status conditions

Settings

Maintenance

Control

Contents

1. Presentation

1.1 MGE TM Galaxy TM 5000 8

UPS cabinet 8

External battery cabinet / auxiliary cabinet 8

1.2 Inside the UPS cabinet, access to connections 9

1.3 Cabinet layout (normal or false floor) 10

1.4 User-machine interface 11

1.5 Relay communication card 11

2. Installation

2.1 Location 12

2.2 Layout of cabinets 12

2.3 Removing the cardboard protecting the batteries 13

In the UPS 13

In the external battery cabinet 13

2.4 Required protective devices and cable sizes 14

Recommended upstream protection 14

Recommended downstream protection 14

Earth-leakage current 14

Required cable sizes 15

Required cable sizes for parallel UPS installations with an external bypass 16

2.5 2.5 System earthing arrangements 17

TNS upstream and TNS downstream installation 17

TNC upstream, TNS downstream 18

Installation with upstream IT and downstream TNS 18

Installation with upstream TT and downstream TT (with upstream differential protection) 18

Frequency converter (without Bypass AC input) 19

Parallel configuration without external bypass cabinet and with common normal and Bypass AC inputs (maximum two units in parallel) 19

Parallel configuration without external bypass cabinet and with separate normal and Bypass AC inputs (maximum two units in parallel) 20

Parallel UPS with external bypass cabinet and separate Normal and Bypass AC network inputs (6 UPS in parallel for 4PN) 21

2.6 Connection of power cables in a single UPS unit 22

2.7 Earth-cable connection for a single unit in a TNC earthing system 23

2.8 Connection of power cables for parallel UPS units 24

Equipotential bonding between parallel-connected units 24

Redundant parallel configuration (maximum two UPS units for Pn) 25

2.9 Connection of the 150 kVA external bypass cabinet 28

2.10 Connection of the 360 kVA external bypass cabinet 29

2.11 Connection of the 600 kVA external bypass cabinet 30

2.12 Auxiliary interconnections between UPS units in parallel configurations 31

Redundant parallel configuration (maximum two UPS units) 31

..... 31

Parallel configuration for increased capacity (maximum four UPS units) 32

Fitting the protection cover for the auxiliary interconnection cables 33

2.13 Connection of general shutdown or emergency power off (EPO) terminal block 33

2.14 Connection of the relay communications card 34

2.15 Running the control/communications cables 36

Single UPS 36

Parallel UPS 37

Contents

2.16 Power connections for an external battery cabinet 38

2.17 Assembly and connection of an empty battery cabinet 38

Mounting the battery circuit breaker kit 38

Mounting the shelves and the battery cells 39

2.18 Control connections for an external battery cabinet 40

2.19 Connection of an input isolating transformer 41

2.20 Connection of an output isolating transformer 41

3. Operation

3.1 Shutting down a single UPS 42

3.2 Restarting a single UPS 42

3.3 Shutting down a parallel configuration 43

3.4 Restarting a parallel configuration 43

3.5 Operation of mimic-panel LEDs 44

Single UPS start sequence on Normal AC input 44

Single UPS start sequence on Bypass AC input 44

3.6 Operating modes 45

Normal (double conversion) mode 45

ECO mode (single UPS only) 45

3.7 Load on battery power 46

Transfer to battery power 46

End of battery power 46

3.8 UPS personalisation 46

Access to the personalisation functions 46

Operating mode 47

Frequency 47

Automatic bypass 47

Battery 47

3.9 Relay contacts (communications card) 48

3.10 Display functions 49

4. Maintenance

4.1 Identification of alarms 50

4.2 Life Cycle Monitoring (LCM) 50

4.3 UPS isolation 51

Single UPS 51

Frequency converter 51

UPS operating in ECO mode 51

Parallel UPS configuration without external bypass cabinet 52

Parallel UPS configuration with external bypass cabinet 53

4.4 Return to the normal position 54

Single UPS 54

Frequency converter 54

Parallel UPS configuration without external bypass cabinet 55

Parallel UPS configuration with external bypass cabinet 56

4.5 Training centres 57

5. Environment

6. Available options

Backfeed option 59

NMC (Network Management Card) option 59
Optional communications card with additional power relay 59
Optional serial communications card 59
Telpac Power Services option 59
AS4I option 59
Multislot option 59
External synchronisation module option 59
IP32 option 59

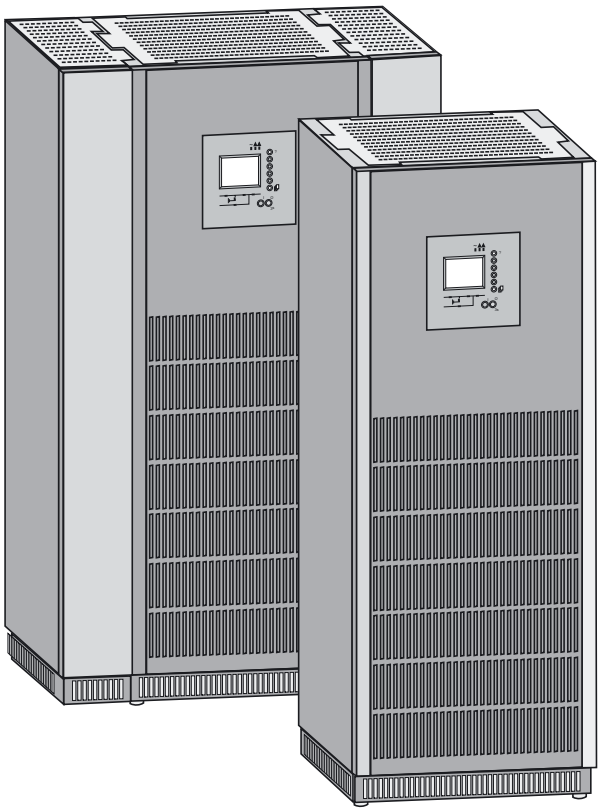
7. Appendices

7.1 Technical sheets 60
Center of gravity 60
Electrical characteristics 61
Thermal characteristics 64
General characteristics of MGE TM Galaxy TM 5000 UPSs 65
General characteristics of MGE TM Galaxy TM 5000 UPSs (cont.) 66
UPS components 66
7.2 Options 67
IP32 installation 67
7.3 Glossary 68

1. Presentation

1.1 MGE™ Galaxy™ 5000

UPS cabinet



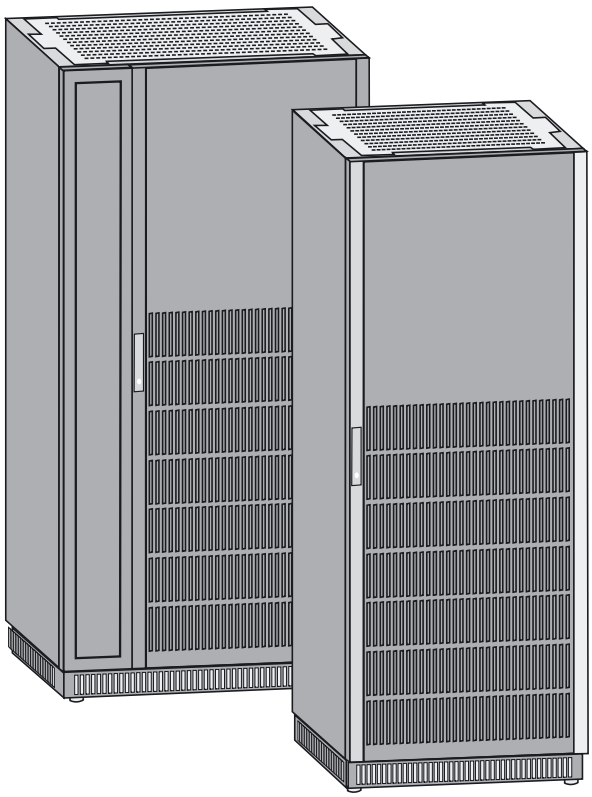
Dimensions

UPS power rating (kVA)	Dimensions (H x W x D)
20/30/40/60 without battery	1900 x 712 x 850 mm
80/100/120 without battery	1900 x 712 x 850 mm
20/30/40/60/80 with internal battery	1900 x 1112 x 850 mm

Weight in kg (UPS without battery or with built-in battery)

Backup time	UPS power rating (kVA)				
	20 30	**40**	**60**	**80**	**100 120**
Without battery	400	400	400	520	520
5 min	808	808	958	1120	
10 min	808	958	1045		
15 min	958	1045			
30 min	1045				

External battery cabinet / auxiliary cabinet



Dimensions (H x W x D) and weight

Cabinet 700 mm (empty)	1900 x 712 x 850 mm 135 kg
Cabinet 1000 mm wide (empty)	1900 x 1012 x 850 mm 150 kg

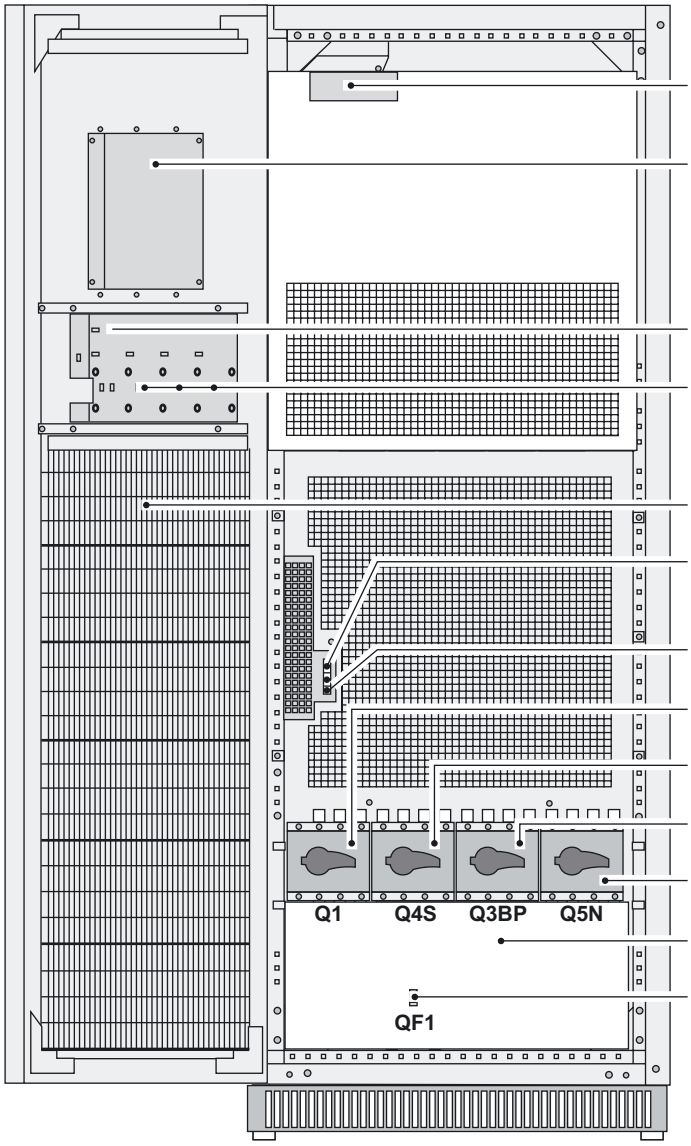
Weight in kg (cabinet alone)

Backup time	UPS power rating (kVA)				
	40	**60**	**80**	**100**	**120**
5 min				885	980
10 min			885	1142	1307
15 min		885	1142	1307	1764
30 min	882	1307	1764	2439	2742

Weights highlighted in grey are for double cabinets.

1.2 Inside the UPS cabinet, access to connections

Example of version with built-in battery



(1) Connectors for auxiliary interconnections of parallel UPS units (INTN card)

(2) User-machine interface

(3) Slot for relay communications card

(4) Free slots for optional communication cards

(5) Open cabinet door

(6) Screw-type terminal block for connections of contacts and coils for two external battery circuit breakers
(7) Screw-type terminal block for connection of emergency power off (EPO)
(8) Q1: input switch for Normal AC input

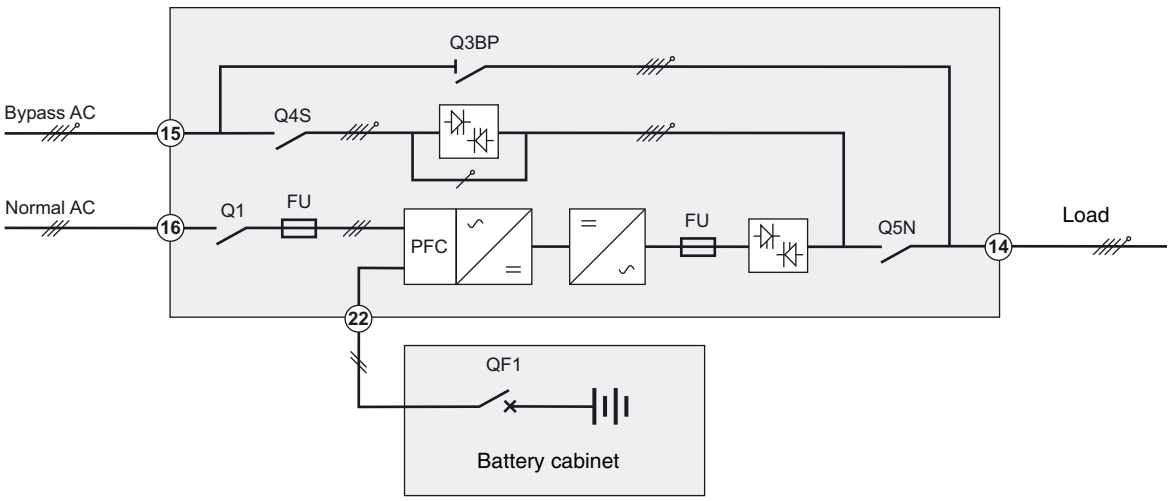
(9) Q4S: input switch for Bypass AC input

(10) Q3BP: bypass switch

(11) Q5N: UPS output switch

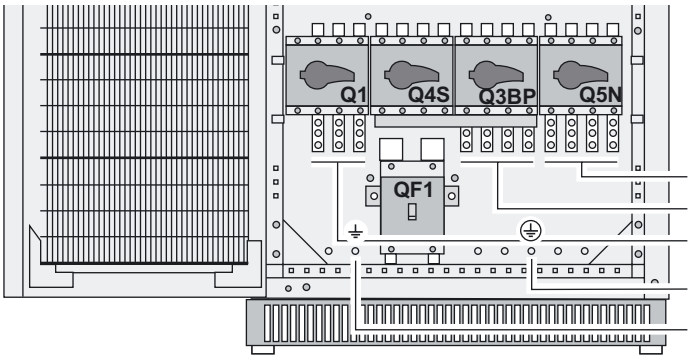
(12) Protection cover for power-connection terminal blocks
(13) QF1: battery circuit breaker (only versions with built-in battery)

Simplified diagram of power connections



1. Presentation

Power-connection terminal blocks (version with built-in battery)

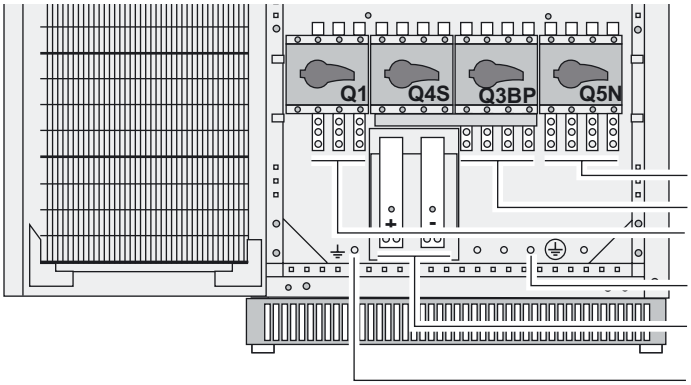


View with terminal-block protection cover removed

(14) Terminal block for load output
(15) Terminal block for Bypass AC input
(16) Terminal block for Normal AC input

(17) Main earthing connector
(18) Secondary earthing connector (auxiliary cabinets)

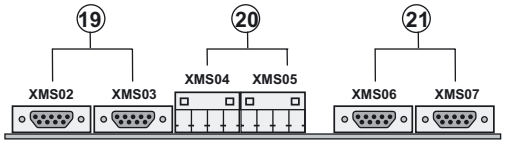
Power-connection terminal blocks (version with external battery)



(14) Terminal block for load output
(15) Terminal block for Bypass AC input
(16) Terminal block for Normal AC input

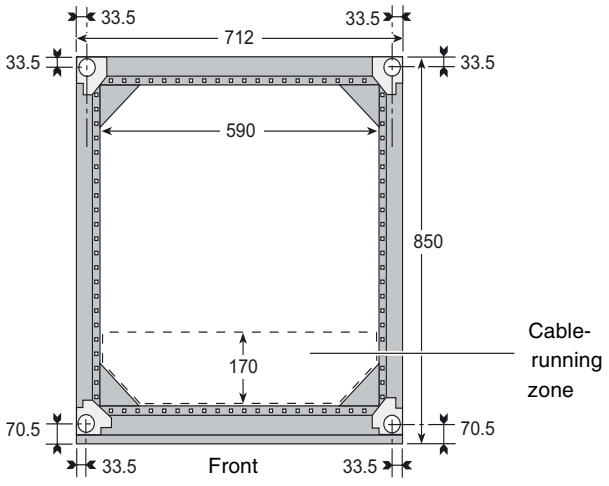
(17) Main earthing connector
(22) Connection of external battery (+/- poles)
(18) Secondary earthing connector (auxiliary cabinets)

INTN card for auxiliary interconnections of parallel UPS units



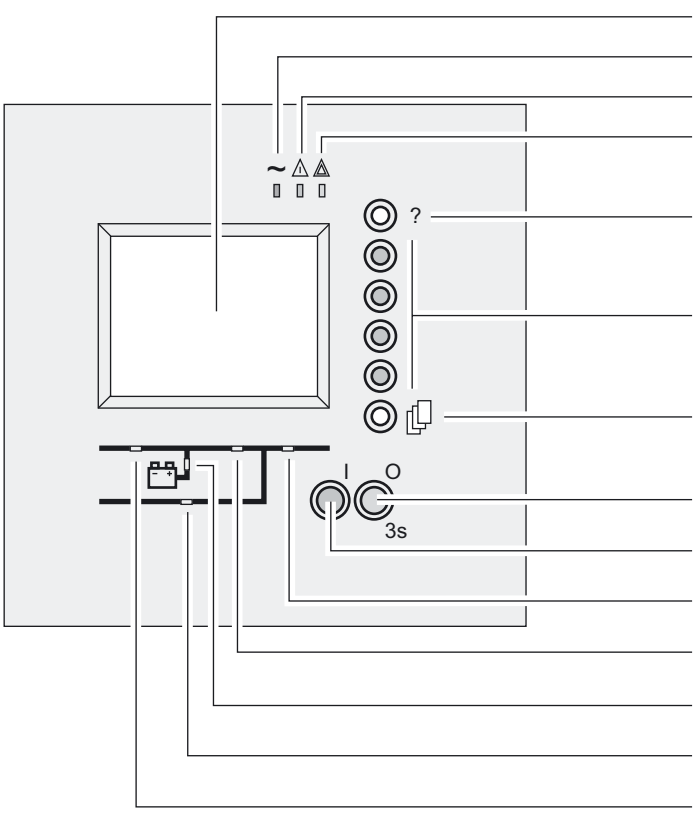
(19) DB9 connectors: exchange-current information
(20) Screw connectors: position information on Q5N, Q4S and Q3BP switches, from the external bypass
(21) DB9 connectors: CAN communication information between UPSs

1.3 Cabinet layout (normal or false floor)



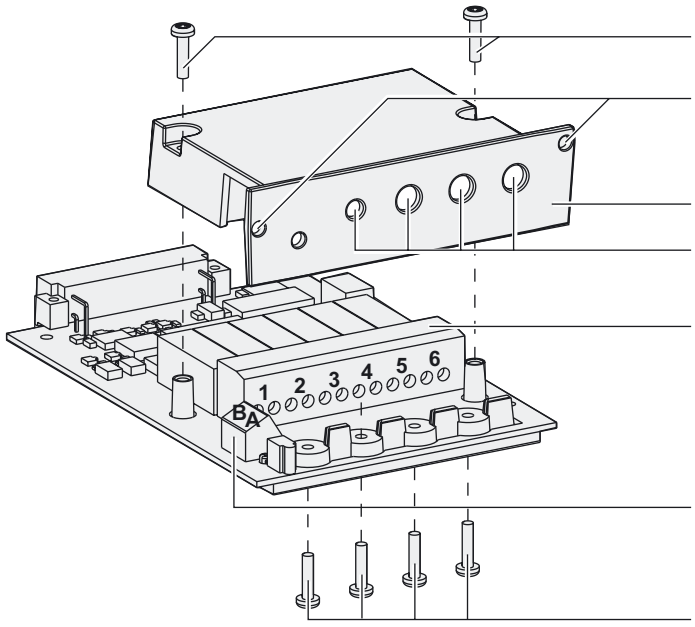
The four feet of the cabinet are cylindrical, 40 mm in diameter.
The measurements opposite include cabinet siding (panels and door).

1.4 User-machine interface



(30) Graphical display
(31) Load protected LED
(32) Minor fault LED
(33) Major fault LED
(34) Help key
(35) Function keys
(36) Menu key
(38) OFF button
(37) ON button
(42) Load supplied LED
(40) UPS ON LED
(41) Operation on battery power LED
(43) Bypass in operation LED
(39) PFC ON LED

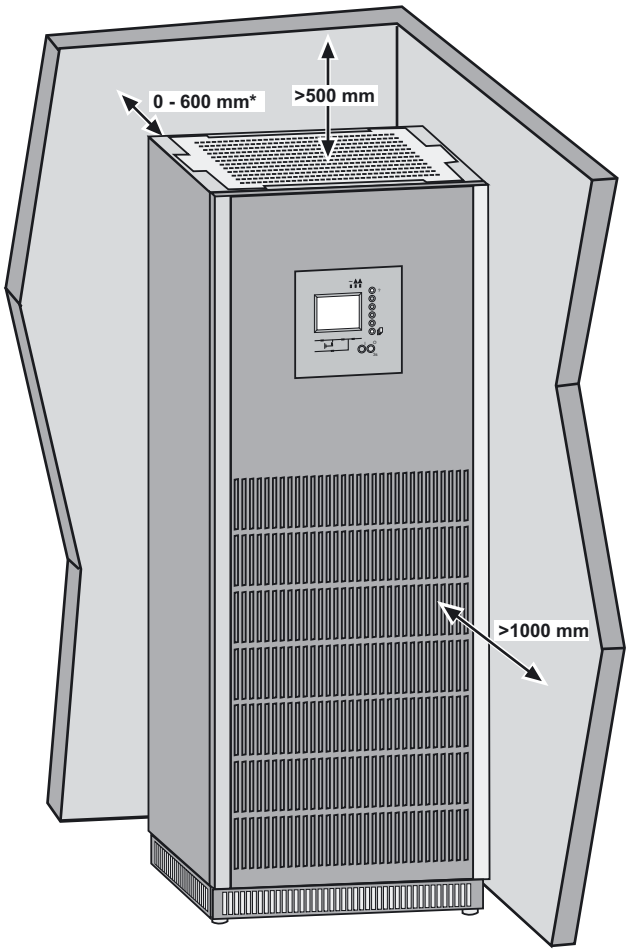
1.5 Relay communication card



(50) Card cover screws
(51) Card screw holes
(52) Card cover
(53) Cable entry holes
(54) Output terminal block
(55) Input terminal block
(56) Cable clamping screws

2. Installation

2.1 Location



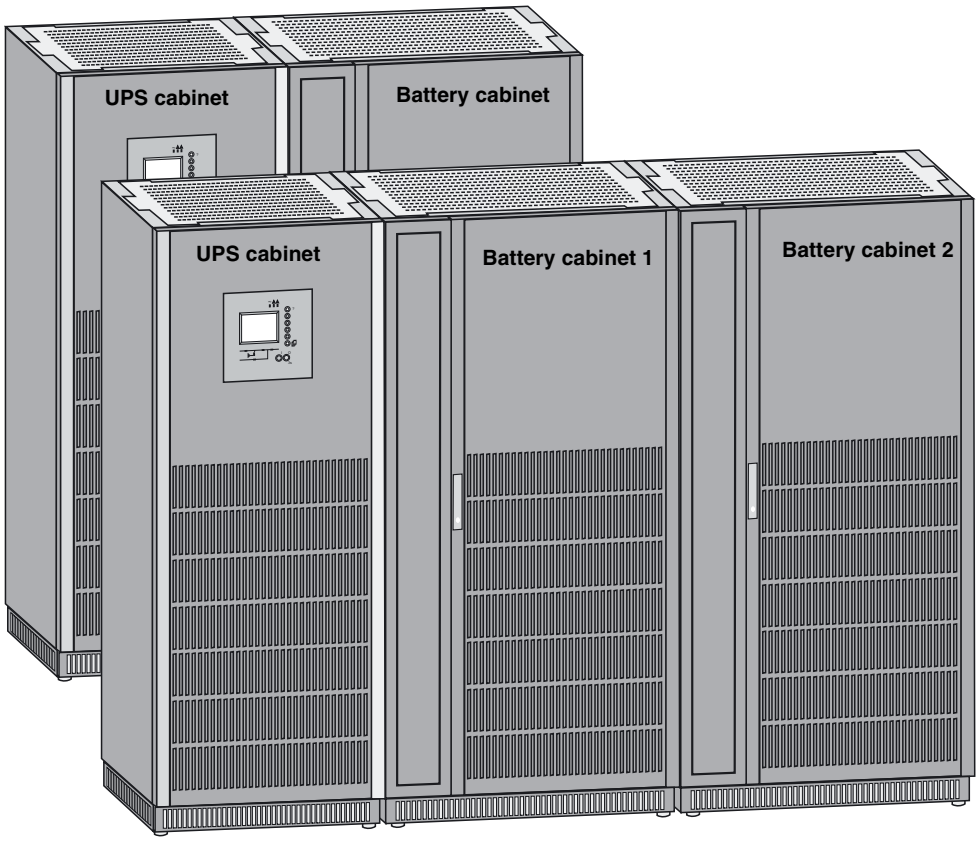
To ensure correct ventilation, leave nothing on top of the UPS.
Leave one meter of free space in front of the UPS for door opening.
The cabinet rests on four cylindrical feet, 40 mm in diameter, positioned in the four corners of the cabinet to spread the weight.

If 500 mm of free space is not maintained above the UPS, abnormal temperature rise may occur.

The UPS must be installed in a room with restricted access (qualified personnel only).

(*) The UPS can operate correctly back to the wall, but it is preferable to leave some space for easier maintenance.

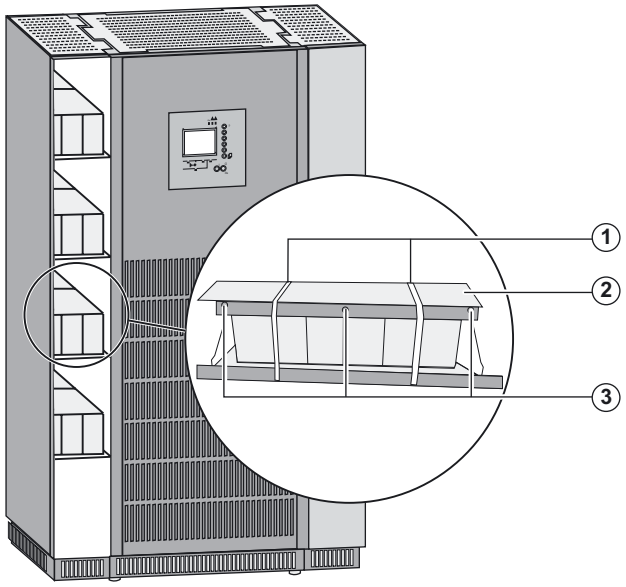
2.2 Layout of cabinets



2.3 Removing the cardboard protecting the batteries

In the UPS

The cardboard protecting the batteries must always be removed once the equipment is installed in its final location.



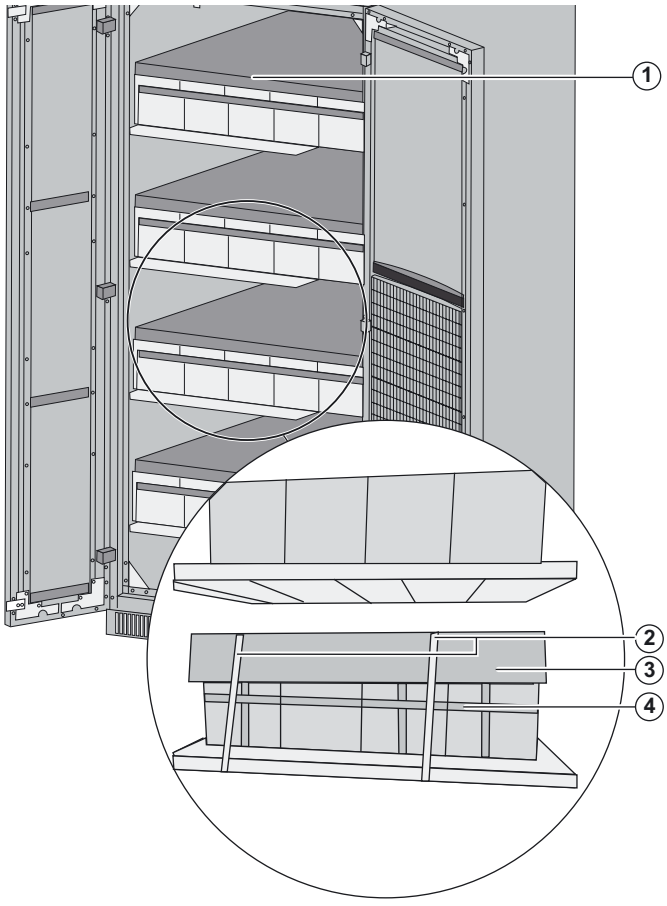
1 - Remove the ties holding the cardboard **(1)**.

2 - Remove the cardboard **(2)**.

3 - Remove the struts **(3)**.

In the external battery cabinet

The cardboard protecting the batteries must always be removed once the equipment is installed in its final location.



1 - Remove the battery support upright **(1)**.

2 - Remove the ties holding the cardboard **(2)** (1000 mm external battery cabinet).

3 - Remove the cardboard protecting the batteries **(3)**.

4 - Remove the ties holding the batteries **(4)**.

2. Installation

2.4 Required protective devices and cable sizes

Recommended upstream protection

UPS power rating	Upstream circuit-breaker on separate Normal AC input	Upstream circuit-breaker on separate Bypass AC input	Upstream circuit-breakers on common bypass and Normal AC input
20 kVA	C60L - 50 A	NS100N 4P-TM100A	NS100N 4P-TM100A
30 kVA	C60L - 63 A	NS100N 4P-TM100A	NS100N 4P-TM100A
40 kVA	NS100N 3P-TM80A	NS100N 4P-TM100A	NS100N 4P-TM100A
60 kVA	NS125E 3P-TM125A	NS125E 4P-TM125A	NS125E 4P-TM125A
80 kVA	NS160N 3P-TM160A	NS160N 4P-TM160A	NS160N 4P-TM160A
100 kVA	NS250N 3P-TM200A	NS250N 4P-TM250A	NS250N 4P-TM250A
120 kVA	NS250N 3P-TM250A	NS250N 4P-TM250A	NS250N 4P-TM250A

The circuit breakers recommended above respect the requirements for discrimination with the UPS fuses

Stick a label with the following text on each upstream circuit breaker:
"Isolate Uninterrptible Power Supply (UPS) before working on this circuit".

Recommended downstream protection

UPS power rating	Downstream circuit breaker	Trip unit
20-30-40 kVA	C60N	C 16A
	C60N	B 25A
60 kVA	C60N	C 20A
	C60N	B 32A
80 kVA	C60N	C 25A
	C60N	B 50A
100-120 kVA	C60N	C 32A
	C120N	B 63A
	NS100	TMG 50A

Curve N for the downstream circuit breaker may be replaced by curve H or L, depending on the installation.
The indicated protection ensures discrimination for each output circuit downstream of the UPS, whether supplied by via the normal or the Bypass AC source. If these recommendations are not followed, a short-circuit on an output circuit can result in a break in power longer than 20 milliseconds on all the other output circuits.

Note. See the simplified diagrams in the appendix for common or separate AC inputs, indicating the positions of the protection devices, the characteristics of the internal UPS fuses and UPS line currents under overload conditions.

Earth-leakage current

UPS earth-leakage current is 1 A.

Required cable sizes

Cable sizes are determined for copper conductors (for aluminium conductors, increase the size by 30%). Size calculations also take into account a voltage of 400 V and grouping of four cables.

UPS power rating	Minimum sizes for separate Normal AC input copper cables (<100 m)	Minimum sizes for separate Bypass AC input copper cables (<100 m)	Minimum sizes for common bypass and Normal AC input copper cables (<100 m)	Minimum sizes for copper load-circuit cables (<100 m)	Battery/terminal connection (<15 m)
20 kVA	10 mm^2	16 mm^2	16 mm^2	16 mm^2	16 mm^2
30 kVA	16 mm^2	16 mm^2	16 mm^2	16 mm^2	25 mm^2
40 kVA	16 mm^2	16 mm^2	16 mm^2	16 mm^2	35 mm^2
60 kVA	25 mm^2	25 mm^2	25 mm^2	25 mm^2	70 mm^2
80 kVA	50 mm^2	50 mm^2	50 mm^2	50 mm^2	95 mm^2
100 kVA	50 mm^2	70 mm^2	70 mm^2	70 mm^2	2 x 50 mm^2
120 kVA	70 mm^2	70 mm^2	70 mm^2	70 mm^2	2 x 70 mm^2

Connections are made to pre-drilled terminals.
Hole diameter: 6.5 mm (8.5 mm for 120 kVA).
Earthing cables connect to the earthing plate.
Hole diameter: 6.5 mm (8.5 mm for 120 kVA).

2. Installation

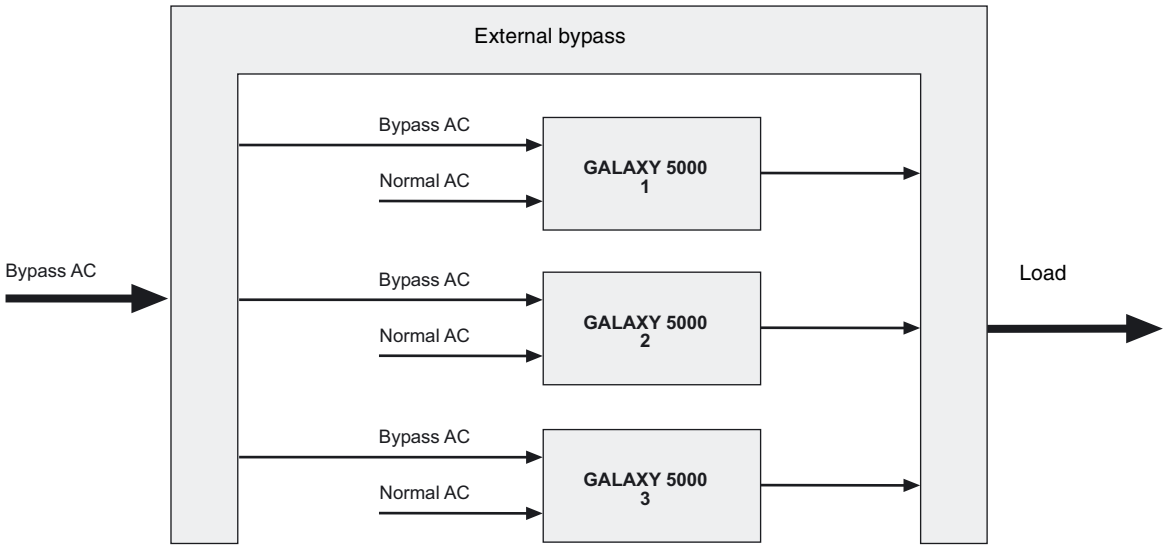
Required cable sizes for parallel UPS installations with an external bypass

Rated power of each UPS unit	Number of parallel UPS units	Total rated power of the UPS	Bypass AC input or load line current	Cable size(1) in mm^2
20 kVA	2 3 4	40 kVA 60 kVA 80 kVA	58 A 87 A 116 A	16 35 50
30 kVA	2 3 4	60 kVA 90 kVA 120 kVA	80 A 129 A 172 A	25 50 70
40 kVA	2 3 4	80 kVA 120 kVA 160 kVA	116 A 174 A 232 A	35 70 120
60 kVA	2 3 4	120 kVA 180 kVA 240 kVA	174 A 261 A 348 A	70 150 185
80 kVA	2 3 4	160 kVA 240 kVA 320 kVA	232 A 348 A 464 A	120 185 2 x 120
100 kVA	2 3 4	200 kVA 300 kVA 400 kVA	288 A 432 A 576 A	150 2 x 95 2 x 150
120 kVA	2 3 4	240 kVA 360 kVA 480 kVA	348 A 522 A 696 A	185 2 x 150 2 x 185

The table opposite is an example for an installation with up to four UPS units.

- For installations with redundant units, take into account only the number of units required to supply the loads (e.g. in a three-unit installation where one unit is redundant, only two units count in determining the input and load currents).
- This table is valid for 400 V input and load phase-to-phase voltages, at rated load with a power factor of 0.8. For voltages of 380 or 415 V, multiply the current values by 1.05 or 0.96 respectively and, if necessary, modify the cable sizes accordingly.
- The cable sizes in this table concern the bold sections in the diagram below.

(1) Cable sizes are determined for U1000 R02V type copper conductors (for aluminium conductors, increase the size by 30%). Size calculations also take into account a voltage of 400 V and grouping of four cables.



2.5 2.5 System earthing arrangements

This chapter lists the main system earthing arrangements and their wiring requirements. For system earthing arrangements which are not listed in this document, please refer to the “SEA guide” reference 34002636XT..

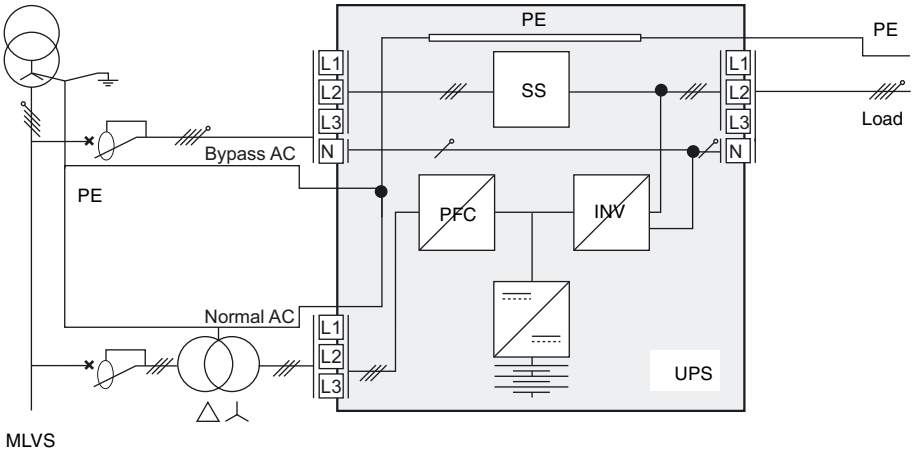
TNS upstream and TNS downstream installation

For separate Normal AC and Bypass AC lines from a single source.

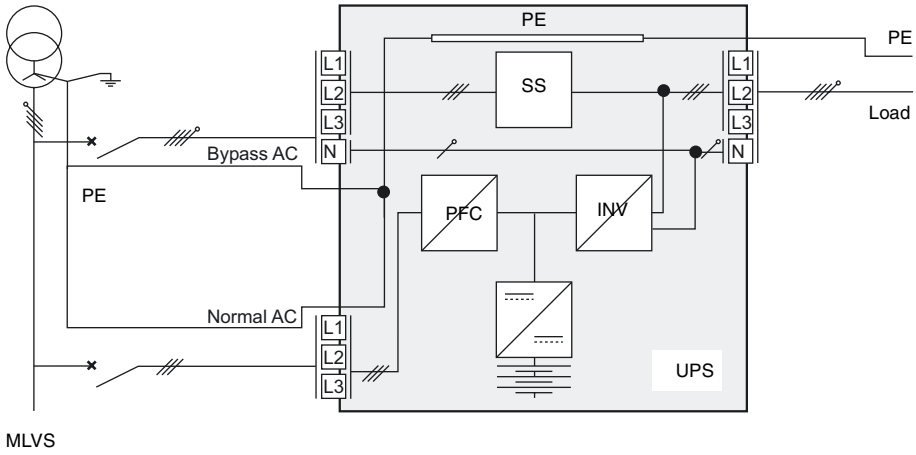
With differential circuit breaker:

The Normal and Bypass AC lines must be galvanically isolated

Upstream differential protection rating must be at least 3A



Without differential circuit breaker:

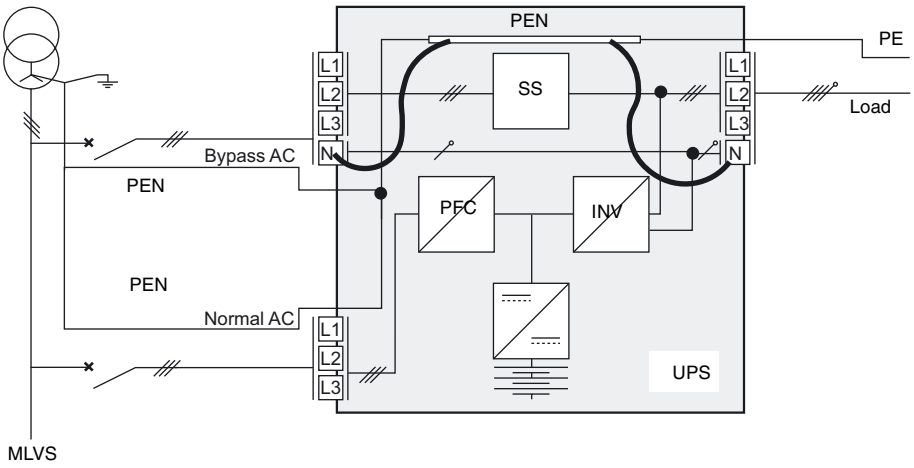


2. Installation

TNC upstream, TNS downstream

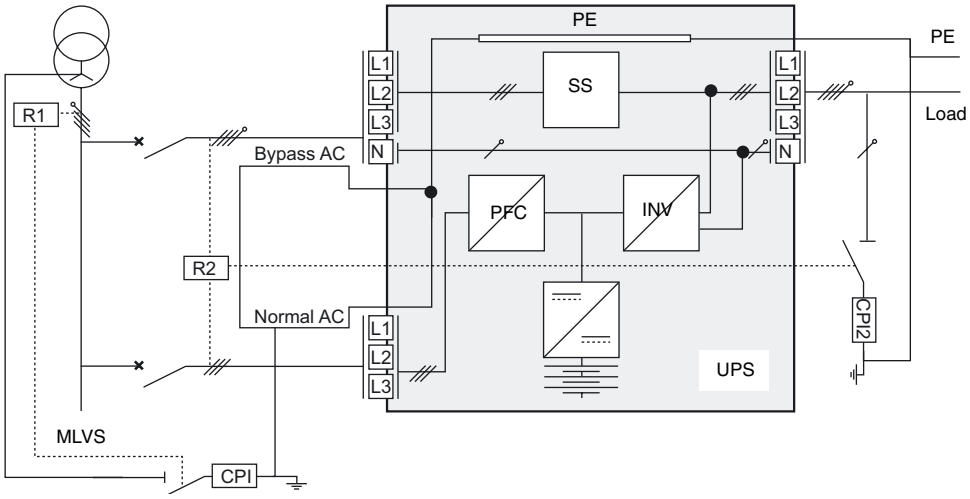
For separate Normal AC and Bypass AC lines from a single source

1.the UPS internal PEN bar must be connected to the Q4S neutral upstream of Q4S
2.The UPS internal PEN bar must be connected to the Q5N neutral downstream of Q5N
3.The UPS internal PE bar must be transformed into a PEN bar (cables supplied for TNC options)



Installation with upstream IT and downstream TNS

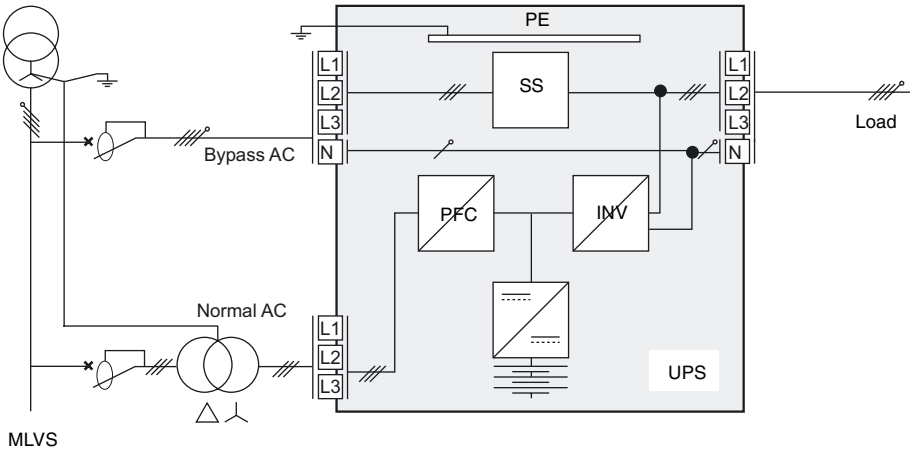
For separate Normal AC and Bypass AC lines from a single source



Installation with upstream TT and downstream TT (with upstream differential protection)

For separate Normal AC and Bypass AC lines from the same source

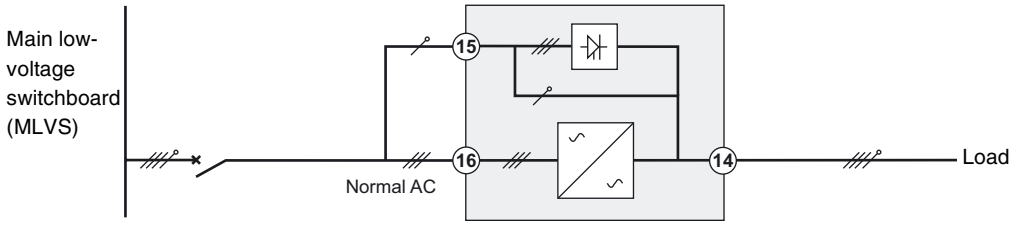
The upstream differential protection rating must be at least 3A



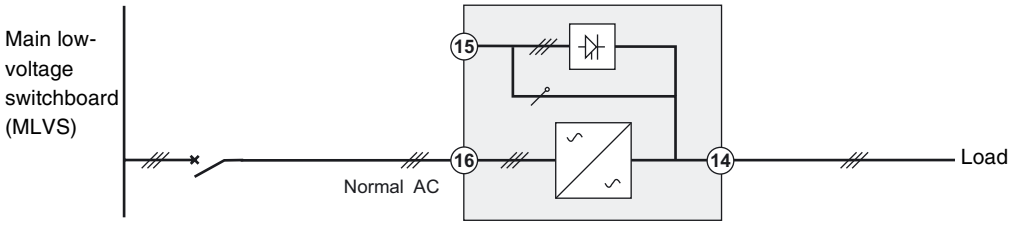
Frequency converter (without Bypass AC input)

The UPS installation may be equipped with earth-leakage protection upstream on the condition that the protection apply to:
- the normal and Bypass AC inputs
- all the parallel-connected UPSs.

Upstream and downstream: TT, TN or IT system with neutral distributed



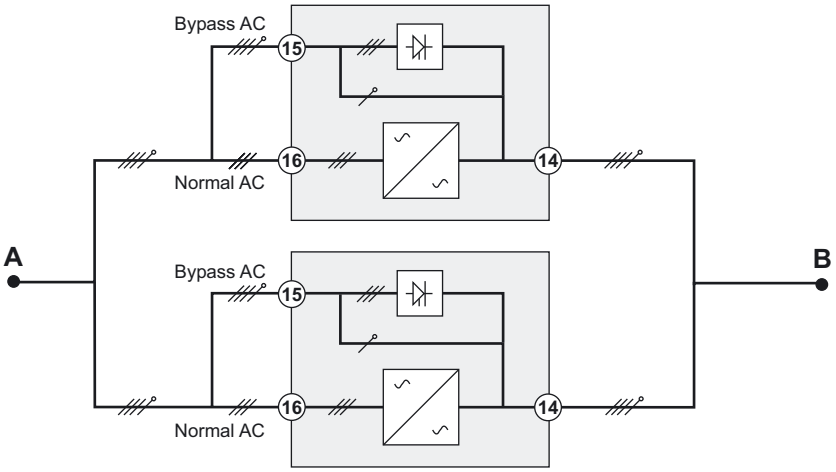
Upstream and downstream: Neutral not distributed



Parallel configuration without external bypass cabinet and with common normal and Bypass AC inputs (maximum two units in parallel)

The UPS installation may be equipped with earth-leakage protection upstream on the condition that the protection apply to:
- the normal and Bypass AC inputs
- all the parallel-connected UPSs.

The requirements for the different system earthing arrangements (SEA) are similar to those for single UPS configurations. In the diagrams on page 17, simply replace the single UPS units between points A and B by the following parallel configuration.

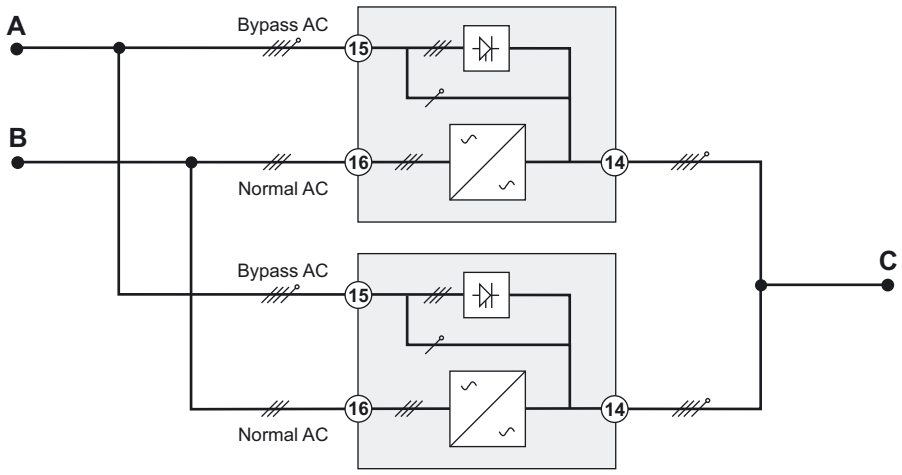


2. Installation

Parallel configuration without external bypass cabinet and with separate normal and Bypass AC inputs (maximum two units in parallel)

The UPS installation may be equipped with earth-leakage protection upstream on the condition that the protection apply to:
- the normal and Bypass AC inputs
- all the parallel-connected UPSs.

The requirements for the different system earthing arrangements (SEA) are similar to those for single UPS configurations. In the diagrams on page 18, simply replace the single UPS units between points A, B and C by the following parallel configuration.

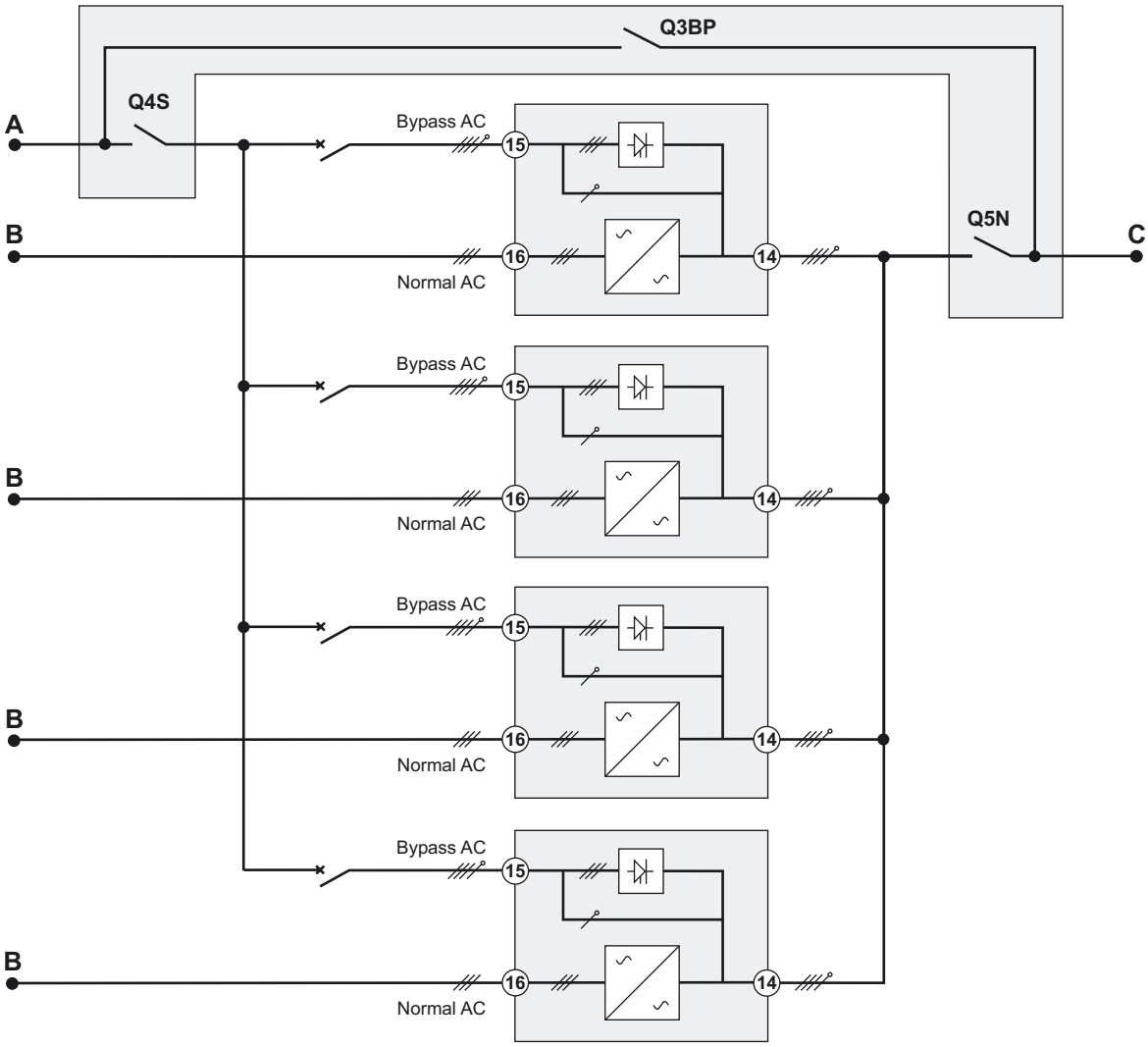


Parallel UPS with external bypass cabinet and separate Normal and Bypass AC network inputs (6 UPS in parallel for 4PN)

The UPS installation may be equipped with earth-leakage protection upstream on the condition that the protection apply to:
- the normal and Bypass AC inputs
- all the parallel-connected UPSs.

The standard diagrams presented below may be adapted to your needs by qualified personnel.

The requirements for the different system earthing arrangements (SEA) are similar to those for single UPS configurations. In the diagrams on page 18, simply replace the single UPS units between points A, B and C by the following parallel configuration.



Connection for the Bypass AC input and the output cables to the external bypass cabinet must use cables having the same length and size to ensure correct balancing of the Bypass AC input currents.

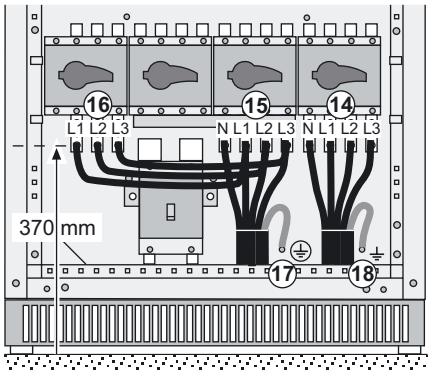
2. Installation

2.6 Connection of power cables in a single UPS unit

Interconnecting the cabinet earths

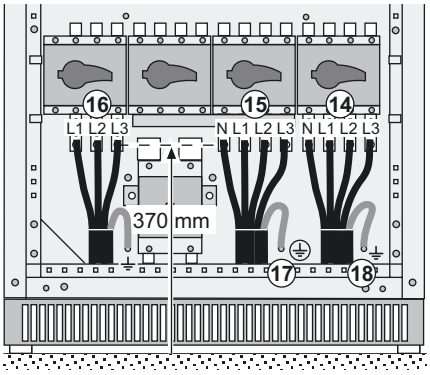
All the cabinet earths must be interconnected: external Bypass cabinet, external battery cabinet, etc.

UPS units with common normal and Bypass AC inputs



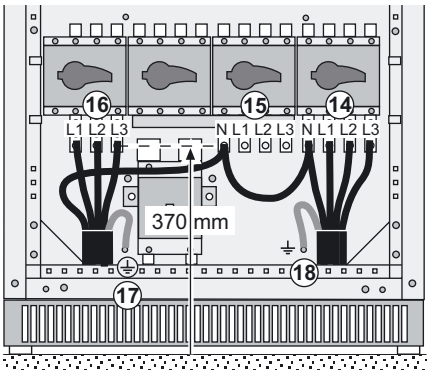
To access the connection terminal blocks, see section 1.2.
1 - The earthing conductors must be connected to the UPS earthing-plate connectors **(17)** and **(18)**.
2 - Connect the four conductors of the Normal AC source to terminal block **(15)**.
3 - Connect the three phases of the Normal AC input **(16)** with the three phases of the Bypass AC input **(15)**.
4 - Connect the four conductors supplying the load to terminal block **(14)**.
5 - Tie the cables down to the frame.
6 - Put the cover back in place (see section 1.2).

UPS units with separate normal and Bypass AC inputs



To access the connection terminal blocks, see section 1.2.
1 - The earthing conductors must be connected to the UPS earthing-plate connectors **(17)** and **(18)**.
2 - Connect the three phases of the Normal AC source to terminal block **(16)**.
3 - Connect the four conductors of the Bypass AC source to terminal block **(15)**.
4 - Connect the four conductors supplying the load to terminal block **(14)**.
5 - Tie the cables down to the frame.
6 - Put the cover back in place (see section 1.2).

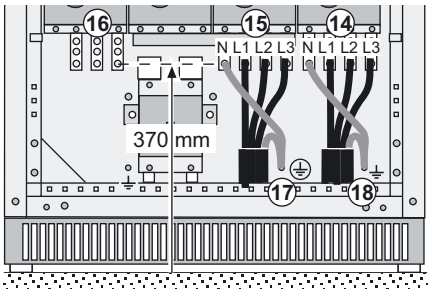
Frequency converter



To access the connection terminal blocks, see section 1.2.
1 - The earthing conductors must be connected to the UPS earthing plate.
2 - Connect the neutral conductor of the Normal AC source to the neutral terminal on terminal block **(15)**.
3 - Connect the three phases of the Normal AC source to terminal block **(16)**.
4 - Connect the four conductors supplying the load to terminal block **(14)**.
5 - Connect the neutral on terminal block **(15)** with the neutral of the supplied loads on terminal block **(14)**.
6 - Tie the cables down to the frame.
7 - Put the cover back in place (see section 1.2).

Do not connect anything to the three phases on the Bypass AC source terminal block (15).

2.7 Earth-cable connection for a single unit in a TNC earthing system



1.Connect the power network cable PEN to the UPS earthing terminal
2.Connect the usage cable PEN to the UPS earthing terminal
3.Connect the Q4S **(15)** neutral terminal to the UPS earth using the cable supplied
4.Connect the Q5N **(14)** neutral terminal to the UPS earth using the cable supplied

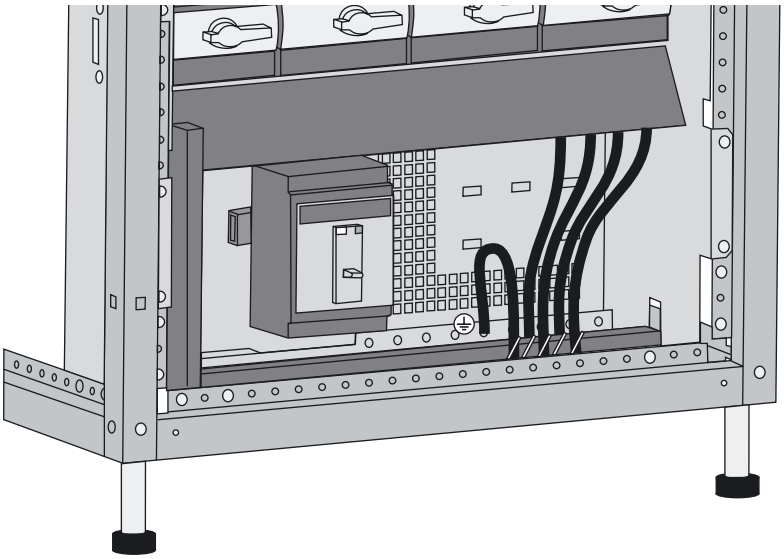
2. Installation

2.8 Connection of power cables for parallel UPS units

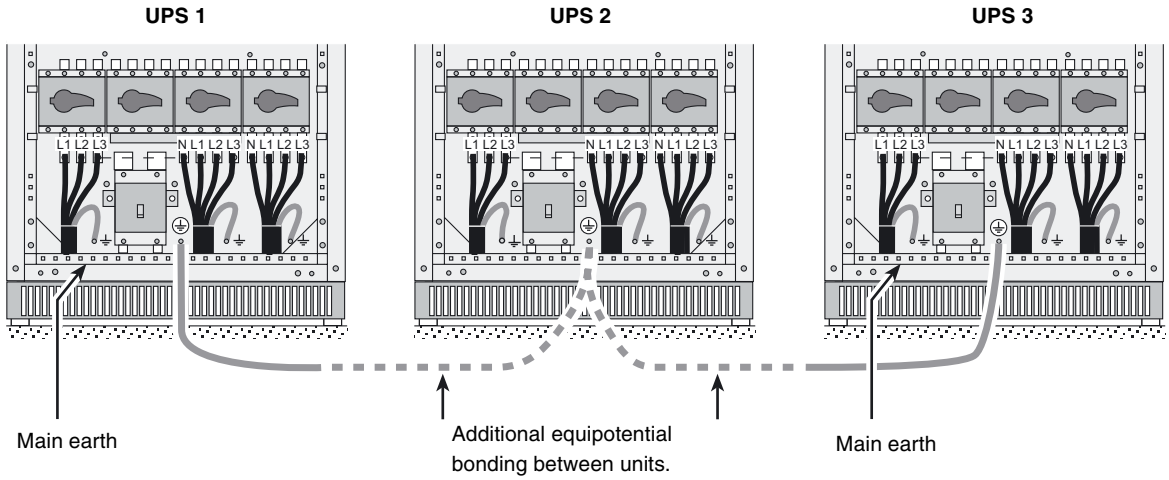
Equipotential bonding between parallel-connected units

Connect the exposed conductive parts (ECP) of the parallel-connected UPS units using an additional earthing cable (not supplied) with the following characteristics:
- size equivalent to that of the supply cables,
- as short as possible.

Connection of earth cable and tying of cables



Connections must be made according to the diagram below:

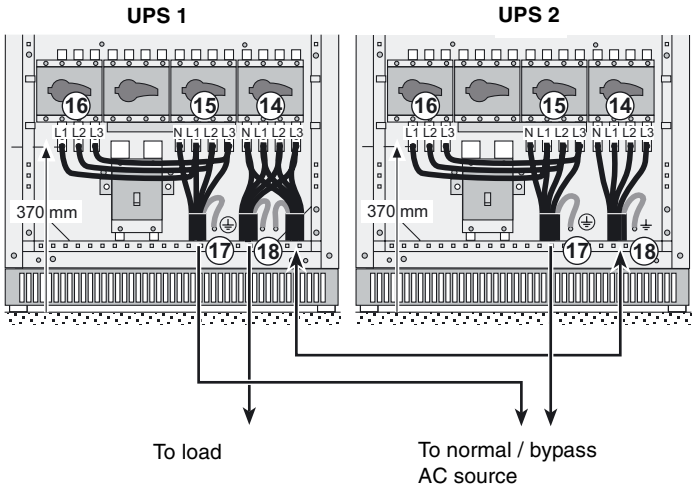


Redundant parallel configuration (maximum two UPS units for Pn)

This configuration does not have an external bypass.

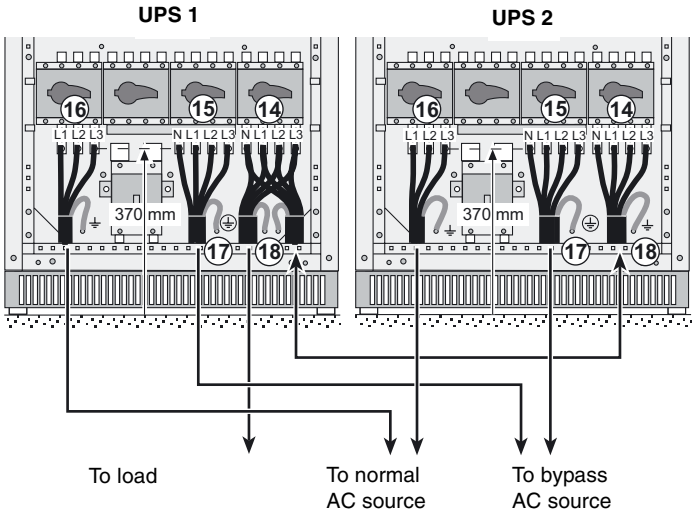
UPS units with common normal and Bypass AC inputs

To access the connection terminal blocks, see section 1.2.



To access the connection terminal blocks, see section 1.2.
1 - The earthing conductors must be connected to the earthing plate of each UPS.
2 - Connect the four conductors of the Bypass AC source to terminal block **(15)** in each UPS unit.
3 - Connect the three phases of the Normal AC input **(16)** with the three phases of the Bypass AC input **(15)** in each UPS unit.
4 - Connect the four conductors of the supplied loads to terminal block **(14)** in UPS1.
5 - Connect terminal block **(14)** in UPS2 to terminal block **(14)** in UPS1 using the four load conductors.
6 - Tie the cables down to the cabinet frames.
7 - Put the covers back in place (see section 1.2).

UPS units with separate normal and Bypass AC inputs

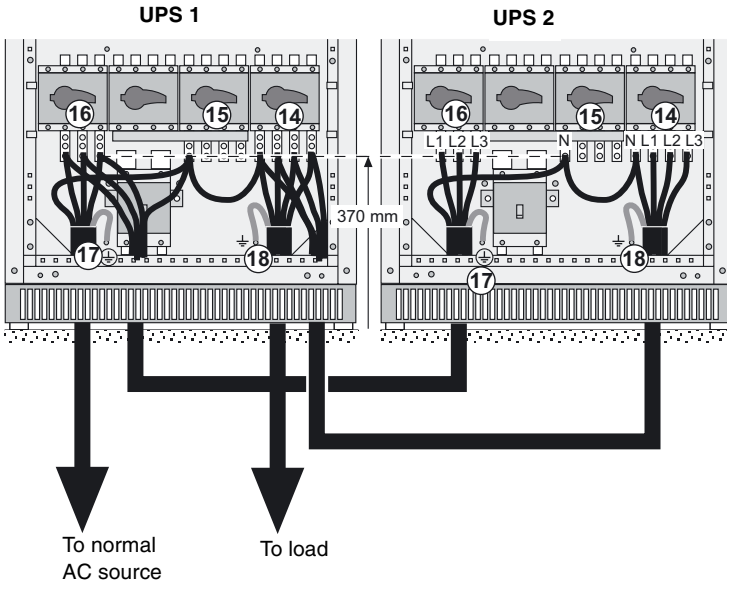


To access the connection terminal blocks, see section 1.2.
1 - The earthing conductors must be connected to the earthing plate of each UPS.
2 - Connect the three phases of the Normal AC source to terminal block **(16)** in each UPS unit.
3 - Connect the four conductors of the Bypass AC source to terminal block **(15)** in each UPS unit.
4 - Connect the four conductors of the supplied loads to terminal block **(14)** in UPS1.
5 - Connect terminal block **(14)** in UPS2 to terminal block **(14)** in UPS1 using the four load conductors.
6 - Tie the cables down to the cabinet frames.
7 - Put the covers back in place (see section 1.2).

Caution. If the two UPSs are placed side by side, connect as indicated above. In the other configurations, always make sure that the cables between the UPSs and Bypass AC source have the same cross-section and the same length. The same is true for the cables between the UPSs and the load.

2. Installation

Frequency converter



To access the connection terminal blocks, see section 1.2.

1 - The earthing conductors of each UPS must be connected to the UPS earthing plate.

2 - Connect the neutral conductor of the Normal AC source to the neutral terminal on terminal block **(15)** of UPS1.

3 - Connect the three phases of the Normal AC source to terminal block **(16)**.

4 - Connect terminal block **(16)** in UPS1 to terminal block **(16)** in UPS2 using the three conductors of the Normal AC source.

5 - Connect the neutral cable on terminal block **(15)** in UPS1 to terminal block **(15)** in UPS2.

6 - Connect the four conductors supplying the load to terminal block **(14)**.

7 - Connect terminal block **(14)** in UPS1 to terminal block **(14)** in UPS2 using the four load conductors.

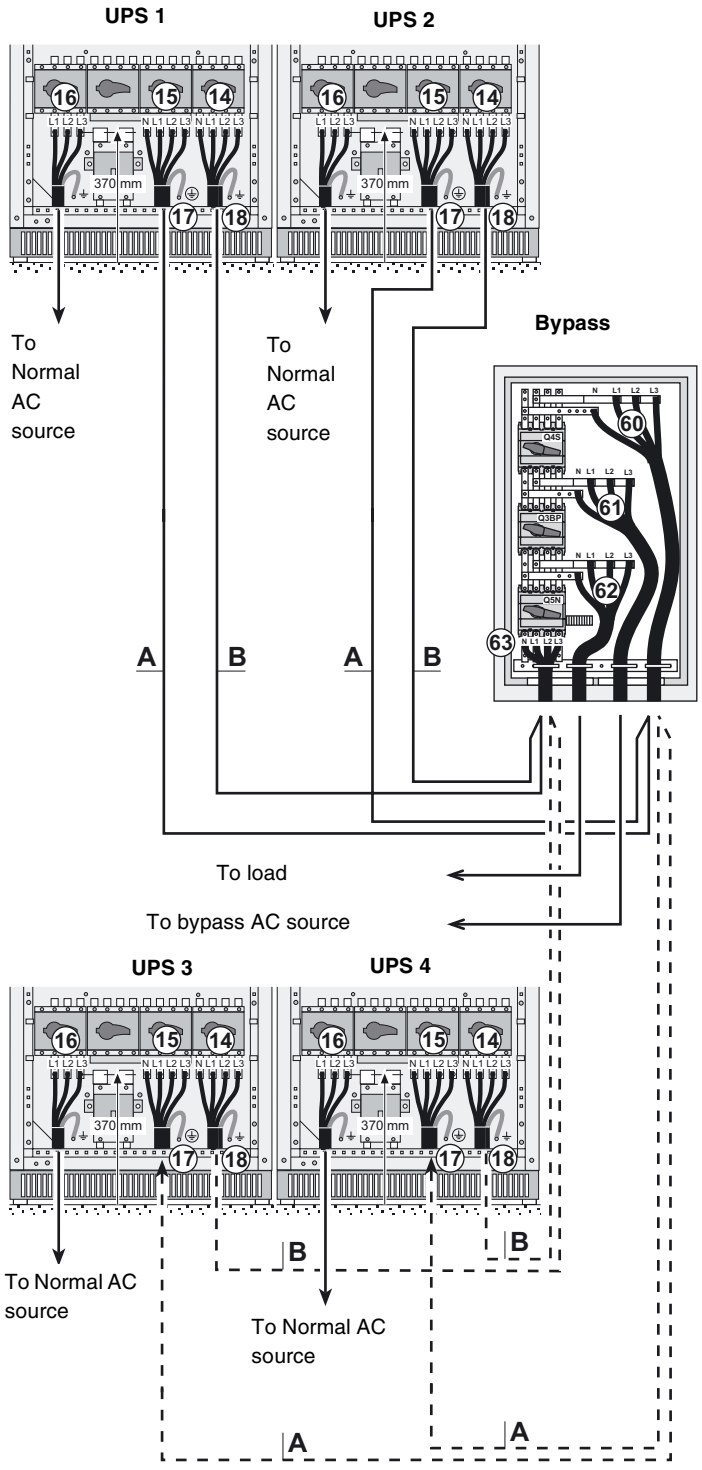
8 - Connect the neutral on terminal block **(15)** with the neutral of the supplied loads on terminal block **(14)**.

9 - Tie the cables down to the frame.

10 - Put the cover back in place (see section 1.2).

Do not connect anything to the three phases on the Bypass AC source terminal block (15).

UPS units with separate normal and Bypass AC inputs



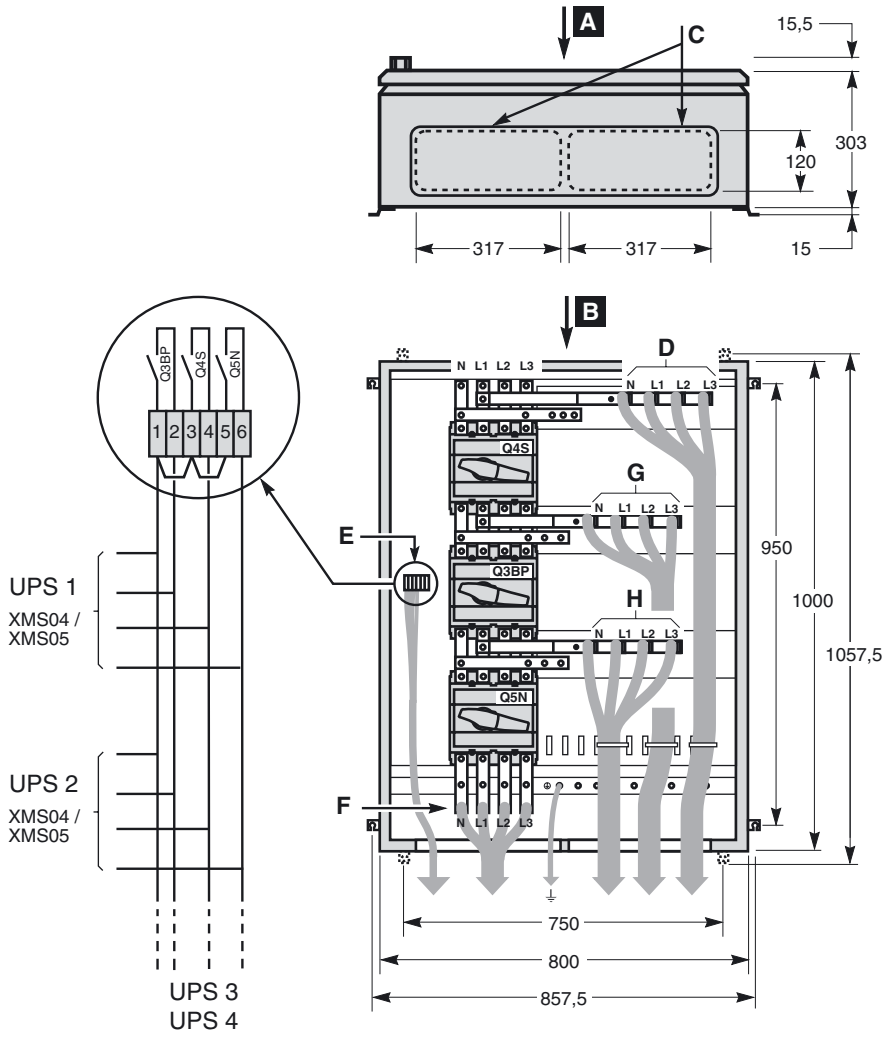
To access the connection terminal blocks, see section 1.2.
1 - The earthing conductors must be connected to the earthing plate of each UPS.
2 - Connect the three phases of the Normal AC source to terminal block **(16)** in each UPS unit.
3 - Connect the four conductors of the Bypass AC source to terminal **(61)** in the bypass cabinet.
4 - Connect terminal blocks **(15)** in each UPS unit to terminal **(60)** in the bypass cabinet, using cables with identical lengths and sizes.
5 - Connect the four load conductors to terminal **(62)** in the bypass cabinet.
6 - Connect terminal blocks **(14)** in each UPS unit to terminal **(63)** in the bypass cabinet, using cables with identical lengths and sizes.
7 - Tie the cables down to the frames of the UPS cabinets and the bypass cabinet.
8 - Put the covers back in place (see section 1.2).

The cables marked A must be identical, i.e. same size and length.
Similarly, the cables marked B must be identical, i.e. same size and length.

To avoid errors, it is advised to remove the handle on switch Q3BP (10) in each UPS.

2. Installation

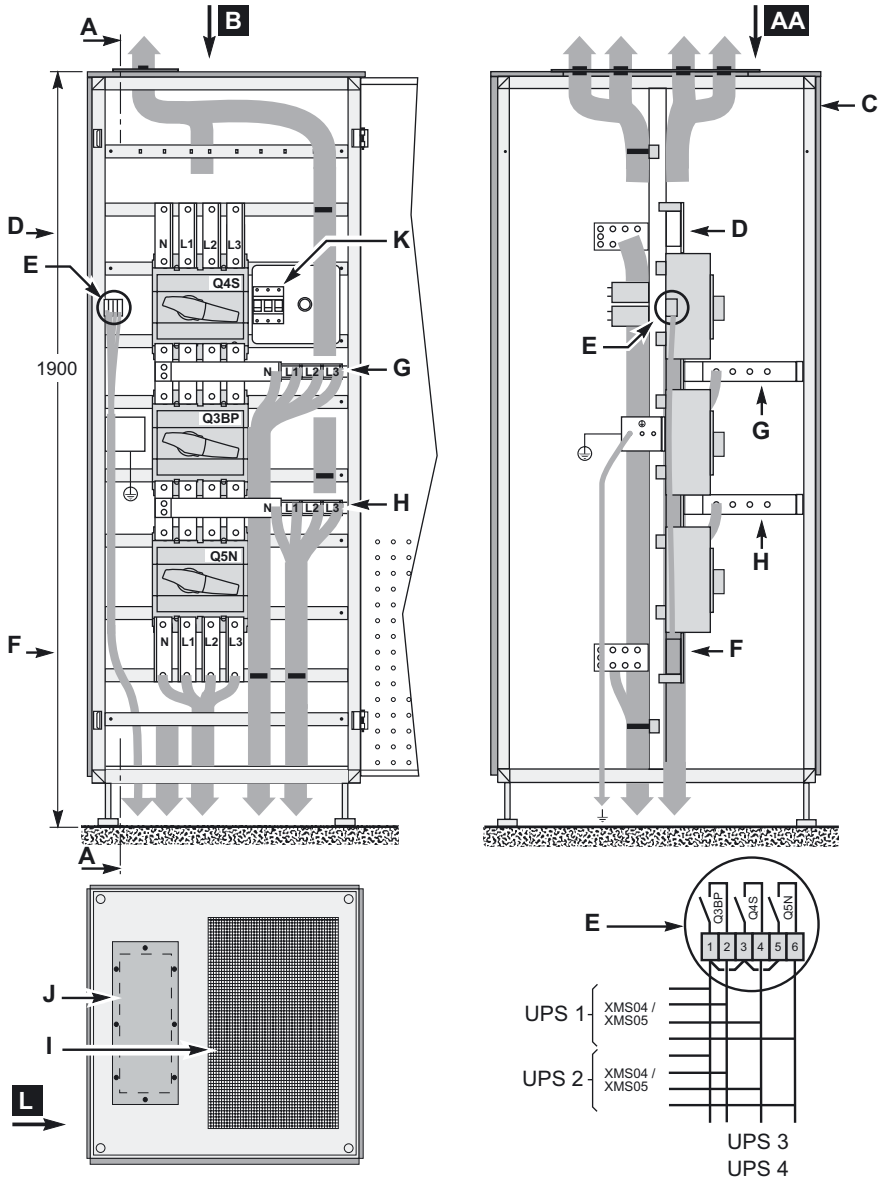
2.9 Connection of the 150 kVA external bypass cabinet



Key

A: top view of cabinet
B: front view of cabinet
C: 317 x 120 mm opening for cable running
D: connection of Bypass AC source to the UPSs
E: connection of auxiliary wires for position of Q4S, Q3BP and Q5N switches
F: connection of UPS load outputs
G: connection of Bypass AC source
H: connection of the load

2.10 Connection of the 360 kVA external bypass cabinet

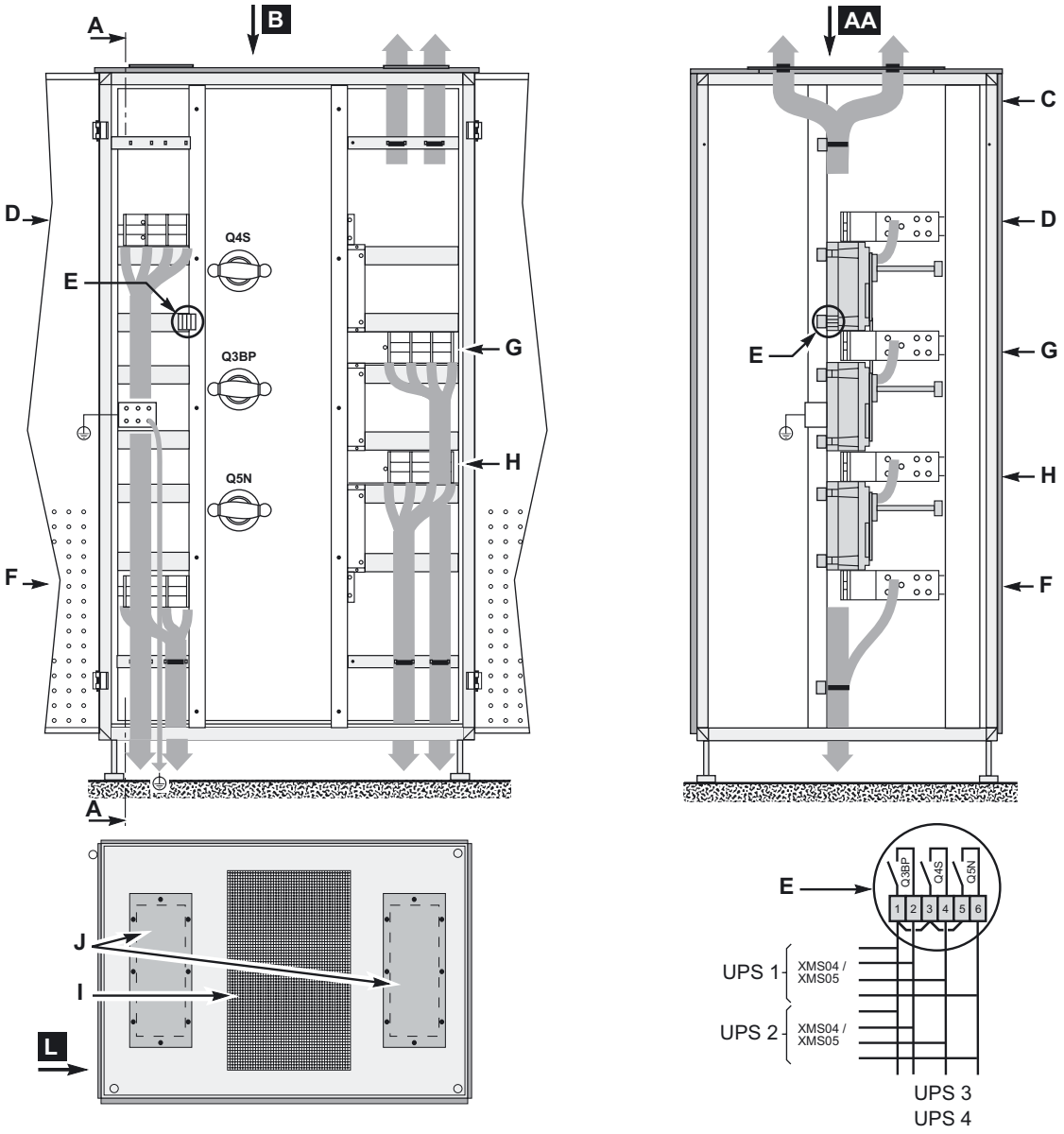


Key

AA: section AA of cabinet
B: front view of cabinet
C: front
D: connection of Bypass AC source to the UPSs
E: connection of auxiliary wires for position of Q4S, Q3BP and Q5N switches
F: connection of UPS load outputs
G: connection of Bypass AC source
H: connection of the load
I : ventilation grate for air exit from cabinet
J: cable running through top, 460 x 197 mm opening and gland plate
K: protection fuses for RC voltage surge suppressor on the Bypass AC line (must be replaced when LED is ON)
L: top view of cabinet

2. Installation

2.11 Connection of the 600 kVA external bypass cabinet



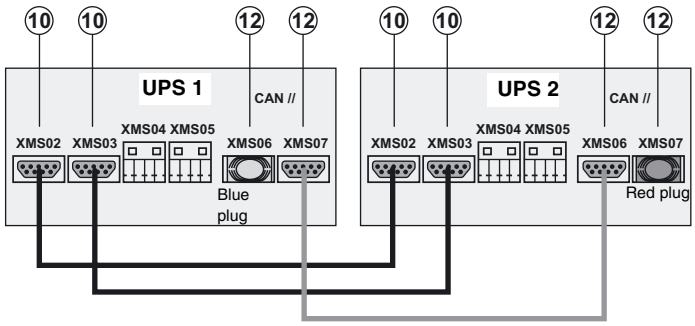
Key

AA: section AA of cabinet
B: front view of cabinet
C: front
D: connection of Bypass AC source to the UPSs
E: connection of auxiliary wires for position of Q4S, Q3BP and Q5N switches
F: connection of UPS load outputs
G: connection of Bypass AC source
H: connection of the load
I : ventilation grate for air exit from cabinet
J: cable running through top, 460 x 197 mm opening and gland plate
L: top view of cabinet

2.12 Auxiliary interconnections between UPS units in parallel configurations

For security reasons, the connections of the auxiliary interconnections of the parallel UPSs must be carried out whilst all the UPSs are de-energised.

Redundant parallel configuration (maximum two UPS units)

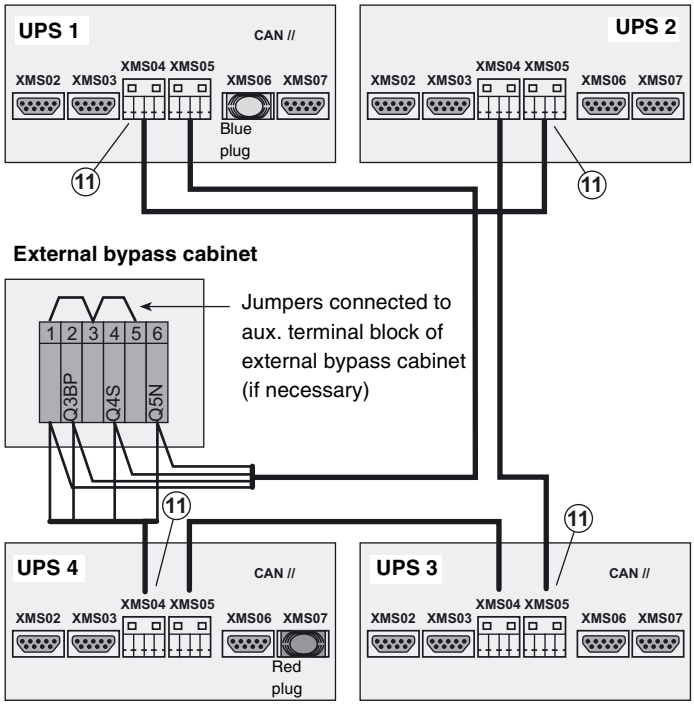


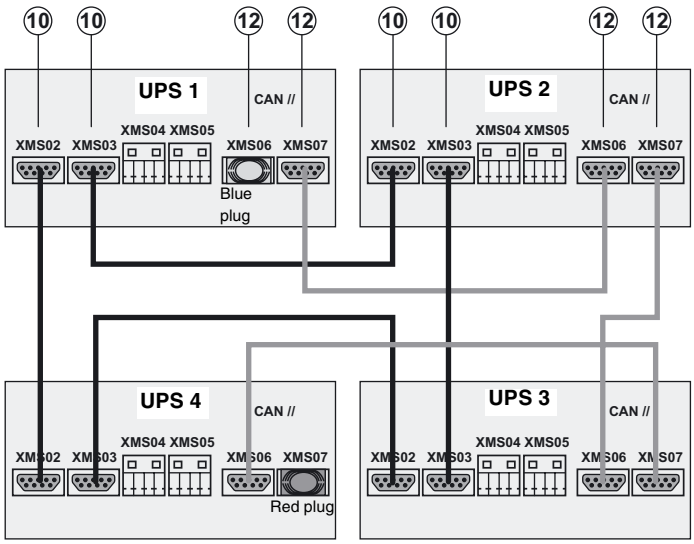
Exchange-current interconnections
Link connectors XMS02 and XMS03 on the two UPS units.
CAN // interconnections:
Fit a blue plug on connector XMS06 on UPS1.
Link connector XMS07 on UPS1 to connector XMS06 on UPS2.
Fit a red plug on connector XMS07 on U PS2.

Note. The supplied cables (10 m) limit the distance between the two UPS units to approximately six meters.

2. Installation

Parallel configuration for increased capacity (maximum four UPS units)



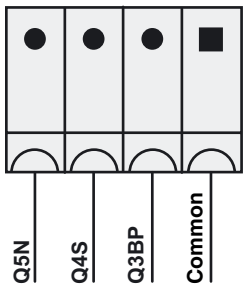


Interconnections with the external bypass cabinet

- Interconnect terminals 1, 3 and 5 on the auxiliary terminal block in the cabinet.
- Create a loop between the cabinet and the UPS units for terminals 1, 2, 4 and 6 on the auxiliary terminal block in the cabinet. The order for the XMS04 and XMS05 connectors in each UPS unit, from right to left, is common, Q3BP, Q4S and Q5N.

Details of terminal blocks (11)

XMS 04 / XMS 05



Note. The interconnection cables for the external bypass cabinet are not supplied (size 2.5 mm^2 maximum).

Exchange-current interconnections (10):
Use the XMS02 and XMS03 connectors to create a loop between the UPS units (all the XMS02 and XMS03 connectors must be used).

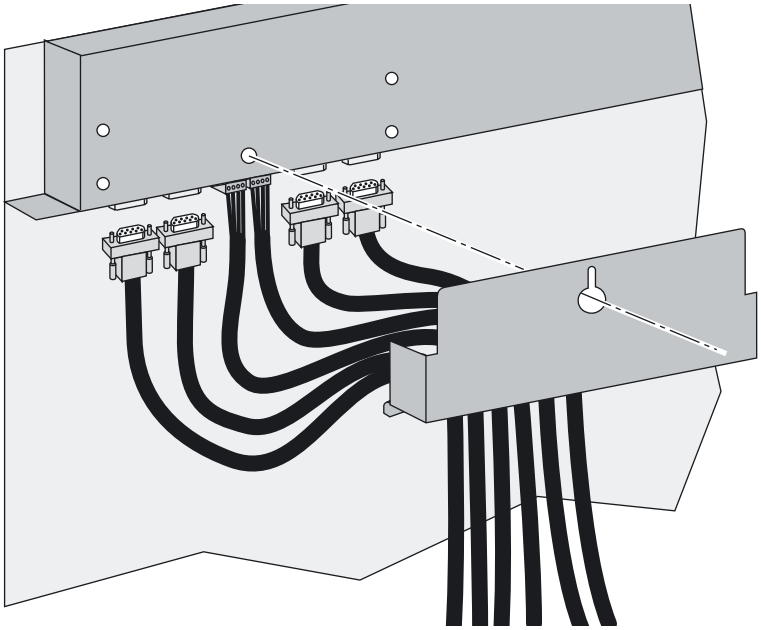
CAN // interconnections (12):
Daisy-chain the UPS units using the XMS06 and XMS07 connectors. Fit a blue plug on the first UPS unit and a red plug on the last unit (all the XMS06 and XMS07 connectors must be used).

Note. The supplied cables are ten meters long.

To ensure sufficient isolation of exchange-current, CAN and external bypass cabinet cables, they must be run separately from the power cables

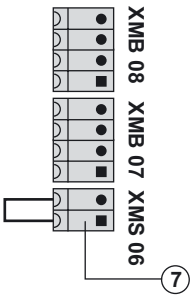
Fitting the protection cover for the auxiliary interconnection cables

The protection cover supplied with the parallel connected UPS units protects the user against direct contact with voltages other than SELVs and ensures the auxiliary interconnection cables are maintained in position.



Note. Tie down the cables as indicated in the diagram in section 2.10.

2.13 Connection of general shutdown or emergency power off (EPO) terminal block



1 - Remove the wire from terminal block **(7)**.
2 - Connect the general shutdown NC contact to terminals 1 and 2 (SELV).
3 - Tie the cable down as illustrated in section 2.10.

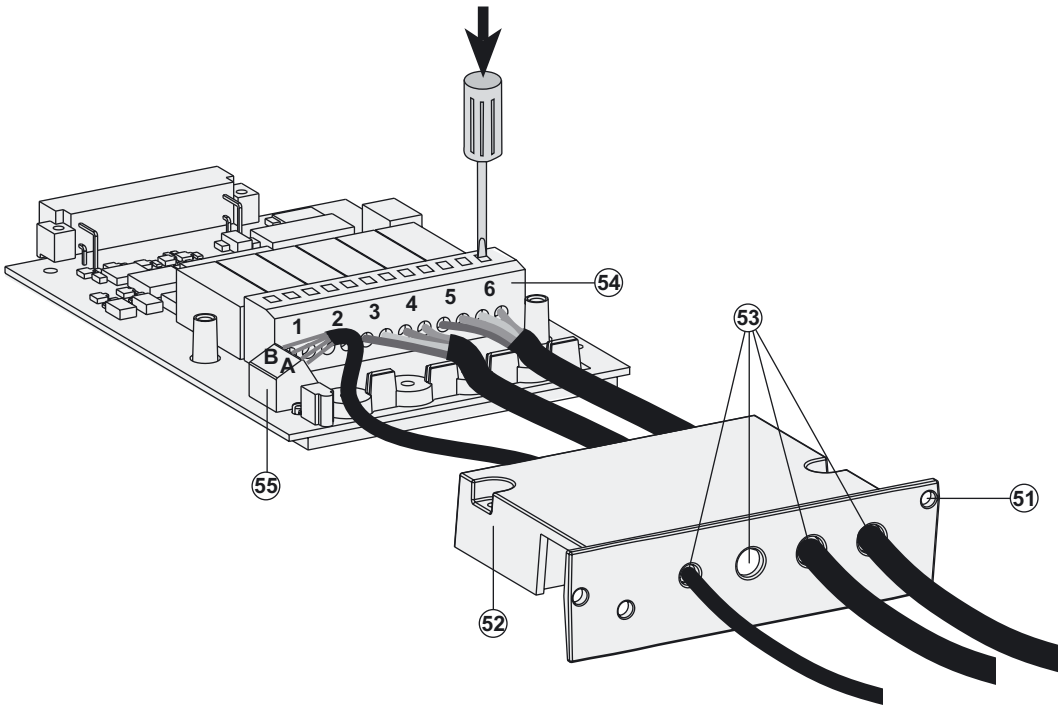
Caution.
In the UPS, pressing the general shutdown button causes UPS shutdown and opening of the battery circuit breaker (with opening of the bypass static switch depending on personalisation settings) .
The Emergency Power Off (EPO) notion is applicable to installations where pressing the button also causes the upstream Normal AC source and Bypass AC source circuit-breakers to open.
In parallel configurations, there must be a single general shutdown button with a separate contact for each UPS unit.

2. Installation

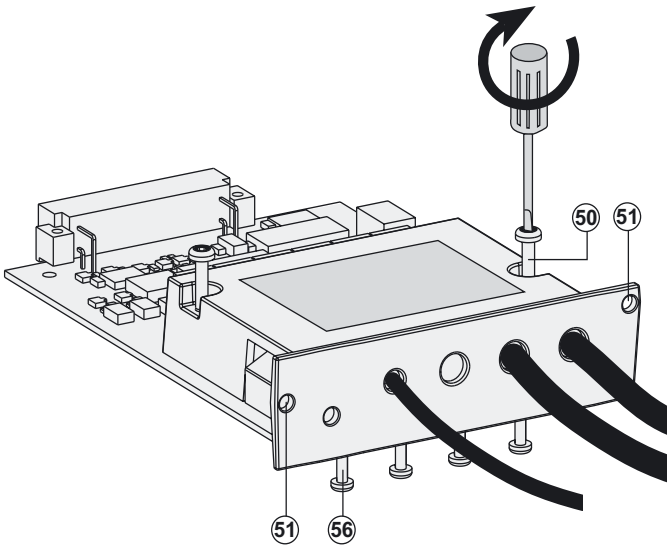
2.14 Connection of the relay communications card

Isolate and lock-out all power sources for this card before making connections.
Never connect SELV (safety extra low voltage) and non-SELV circuits to the different outputs of the same card.

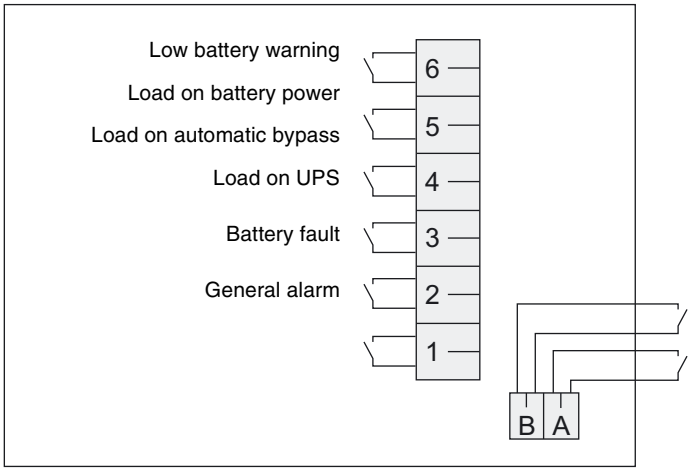
1 - Remove the cover **(52)** secured by the screws **(50)**.
2 - Run the communications cables through the cable entry holes **(53)**.
3 - Connect the conductors to the input **(55)** and output **(54)**terminal blocks.



4 - Put the cover back in place and secure it with the screws **(50)**.
5 - Tighten the screws **(56)** to block the cables.
6 - Indicate the locations of the power sources on the labels.
7 - Insert the card in its slot.
8 - Secure the card with two screws **(51)**.



Characteristics of the contacts on the relay communications card.

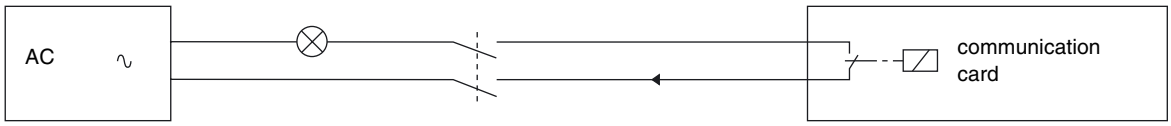


Characteristics of the output contacts:
Permissible voltage: 250V AC, 30V DC.
Permissible current: 2 A.
Cable : 4 x 0.93 mm^2, Ø 6.6 ± 0.3 mm.

Characteristics of the input contacts:
Switched voltage: 5 V DC
Consumption: 10 mA.
Cable: 4 x 0.34 mm^2, Ø 5 ± 0.5 mm.

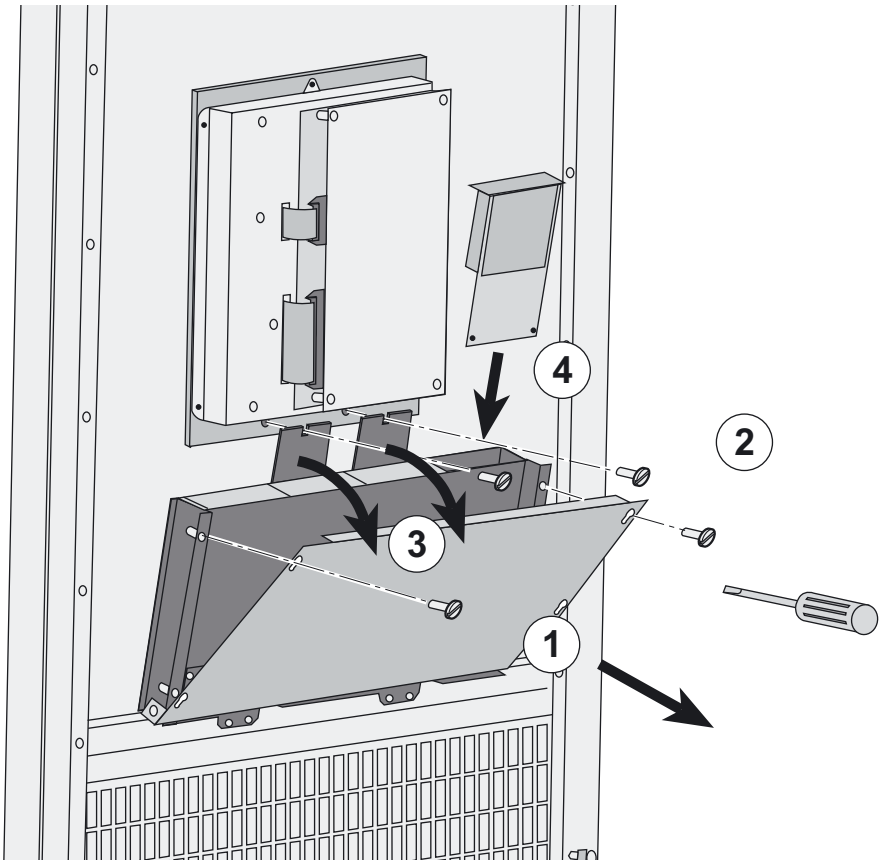
Communications card connection example

If a SELV (safety extra low voltage) source is used, it must always be possible to isolate the communications card from the upstream source to ensure the safety of personnel working on the installation.



Disconnecting device that can be locked

Adding communication cards

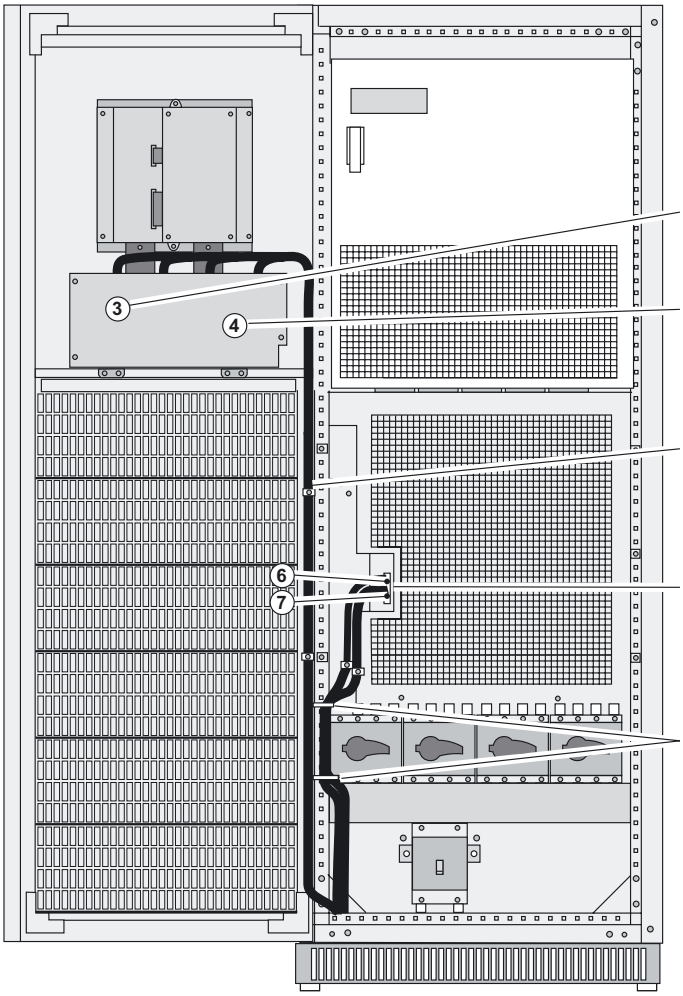


2. Installation

2.15 Running the control/communications cables

Single UPS

The following assembly recommendations must be followed to ensure correct positioning and support of the various strands of the control and communication cables on the front face of the UPS.



Separate the control and communication cables from the power cables.
Run the cables together in front of the protection panels and tie them to the panels as indicated in the figure opposite.

Slot for relay communications card

Free slot for optional communication cards

Tie

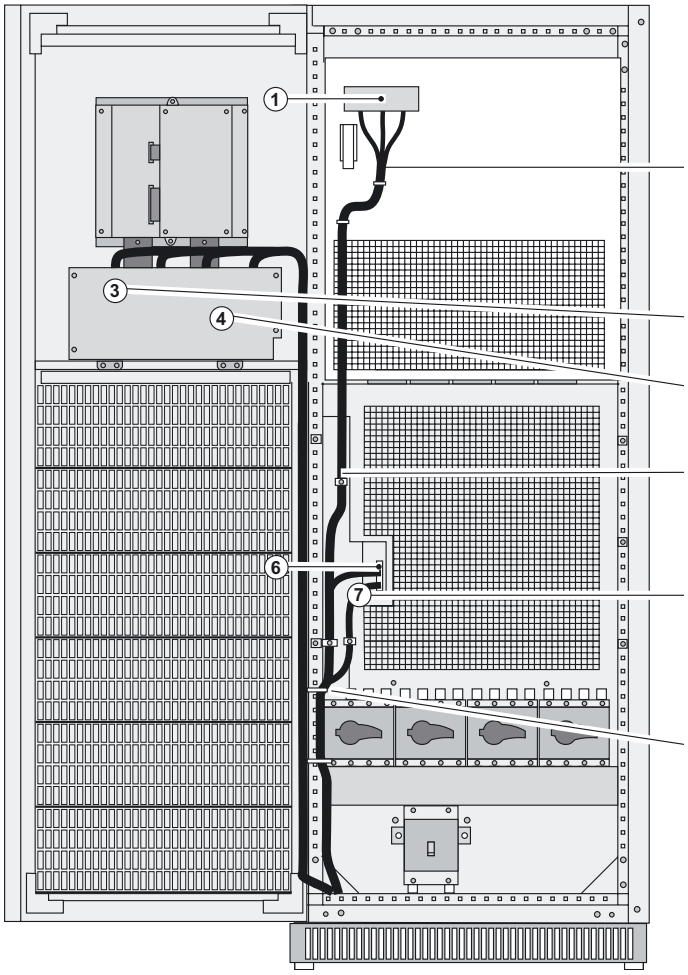
Screw-type terminal block for connection of EPO and battery circuit-breakers.

Ties

Cable description	Insulation level	Location on illustration
Relay communication card	SELV or LV	3
Optional communication card	SELV	4
General-shutdown cable	SELV	6
External battery circuit-breaker cables	SELV	7

To ensure sufficient isolation of exchange-current, CAN and external bypass cabinet cables, they must be run separately from the power cables. Reinforce the insulation of these control and communication cables if any risk of contact with the power cables subsists.

Parallel UPS



Parallel-connection cables for connection to the external bypass cabinet (not supplied max. 2.5 mm²). The CAN and I exchange cables are supplied.

Relay communication card

Optional communications cards

Ties

General-shutdown cable (not supplied, max. 2.5 mm²) and external battery circuit breaker cable must be tied down separately

Ties

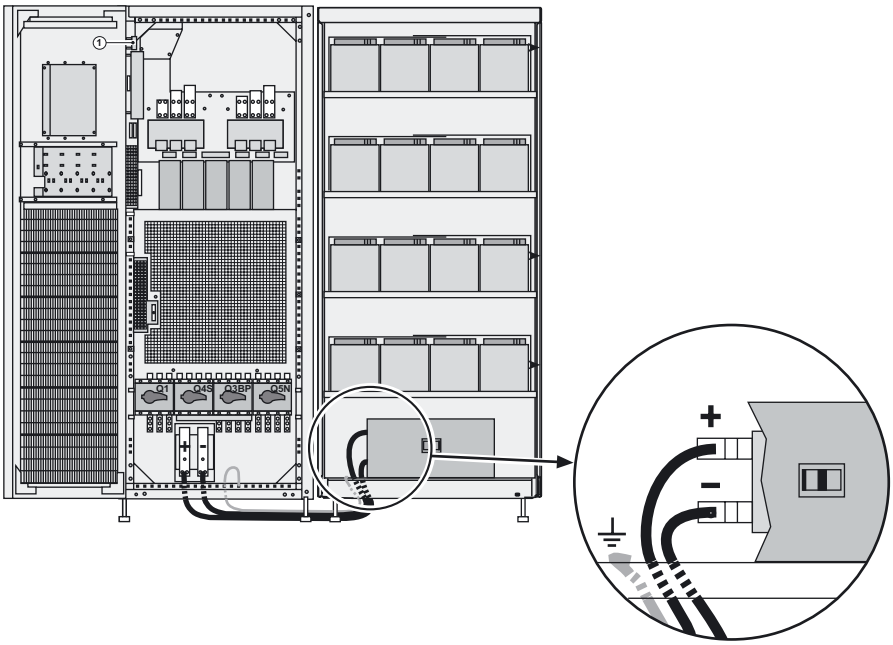
Cable description	Insulation level	Location on illustration
External bypass cabinet cable	ELV	1
CAN cables	SELV	1
Exchange-current cables	SELV	1
Relay communication card	SELV or LV	3
Optional communication card	SELV	4
General-shutdown cable	SELV	6
External battery circuit-breaker cables	SELV	7

To ensure sufficient isolation of exchange-current, CAN and external bypass cabinet cables, they must be run separately from the power cables. Reinforce the insulation of these control and communication cables if any risk of contact with the power cables subsists.

2. Installation

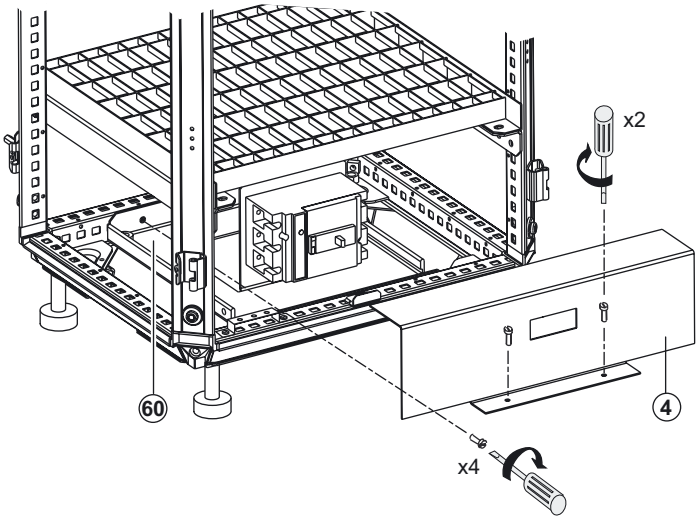
2.16 Power connections for an external battery cabinet

The earth on an external battery cabinet must be connected to the UPS



2.17 Assembly and connection of an empty battery cabinet

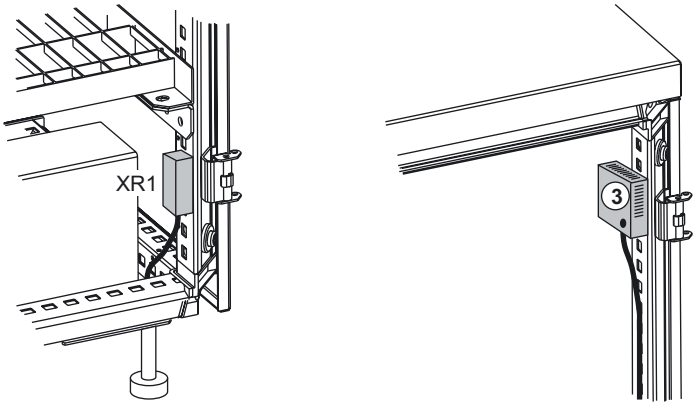
Mounting the battery circuit breaker kit



Secure:
1 - The base plate **(60)** supporting the circuit breaker.
2 - Connector XR1.
3 - The temperature sensor **(3)**.
4 - The front plate **(4)**, after connecting the batteries to the circuit breaker.

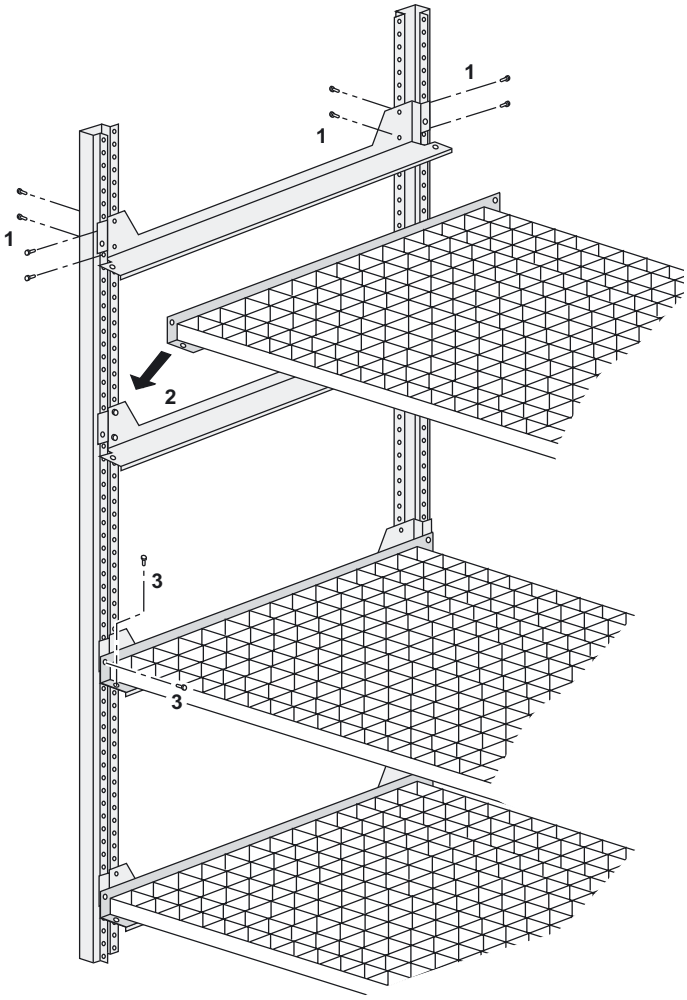
Only one circuit breaker is necessary even if there are several battery cabinets.

The coil control wires and the position contact wires of circuit-breaker QF1 must be connected to the UPS (see page 24).



Please contact our Sales department when selecting the battery circuit breaker.

Mounting the shelves and the battery cells



Caution. Assembly of the battery cabinet must be carried out by certified personnel (standard EN 50091-1-2).

Caution. The minimum clearance between the top of battery cells and the next shelf is 150 millimeters.

1 - Secure the angle supports (6 screws per support).

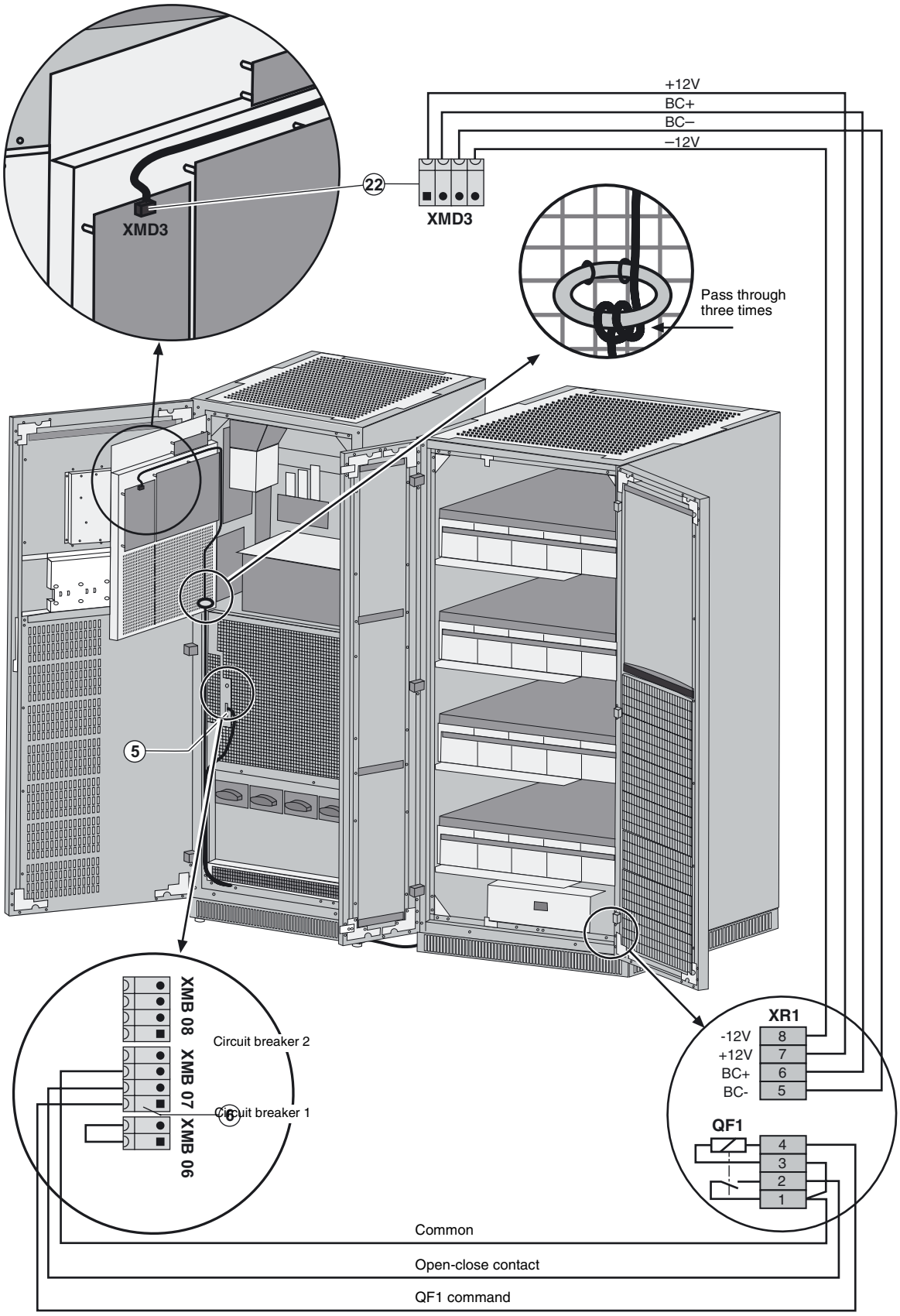
For each shelf:
2 - position the shelf,
3 - secure the shelf with two screws in each angle,
4 - install the battery cells, secure and interconnect them.

5 - Interconnect all the shelves and then connect the overall battery assembly to the battery circuit breaker.

2. Installation

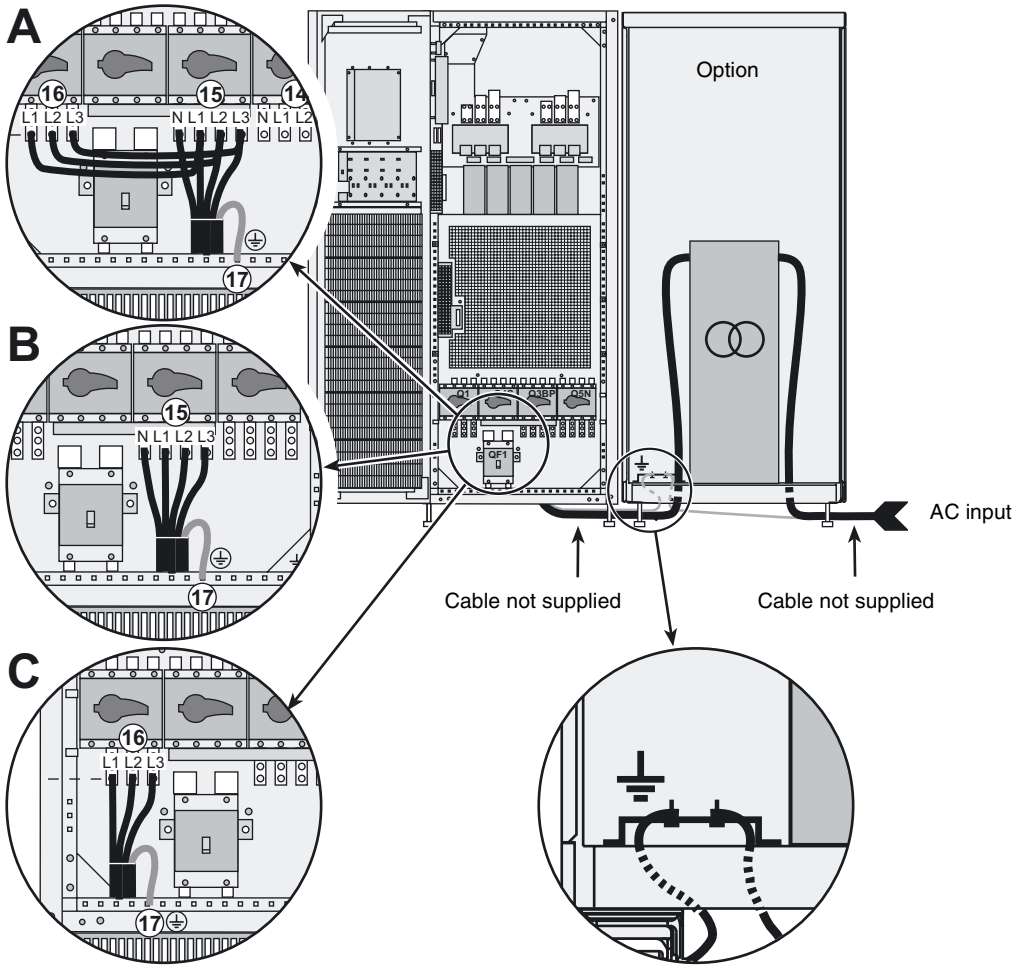
2.18 Control connections for an external battery cabinet

1 - Connect wires 1-2-3-4 on connector XR1 (QF1 position and coil) in the external battery cabinet to connector XMB07 **(6)** (SELV) and wires 7-8-9-10 (temperature sensor) to connector XMD3 **(22)** (SELV).



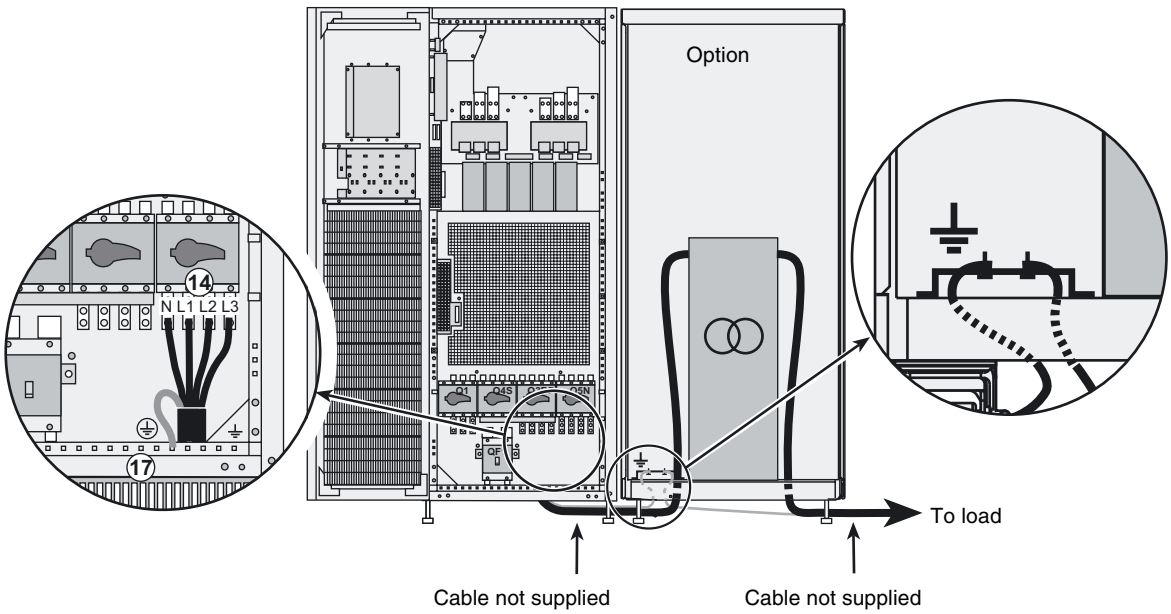
Note. The wires for the screw-type terminal block are not supplied (max. size 2.5 mm^2 and total length less than 100 m).

2.19 Connection of an input isolating transformer



A - Connection of an input transformer for common normal and Bypass AC source.
B - Connection of a Bypass AC input transformer for separate normal and Bypass AC sources.
C - Connection of a Normal AC input transformer for separate normal and Bypass AC sources.

2.20 Connection of an output isolating transformer

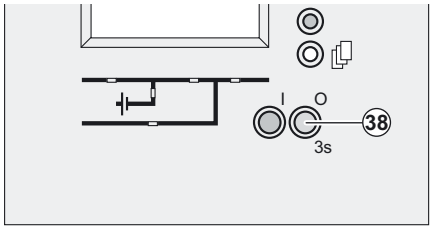


3. Operation

All operations concerning system start-up and compliance with standards and regulations, including those related to the battery cabinet, must be carried out by trained and certified personnel before using the UPS.

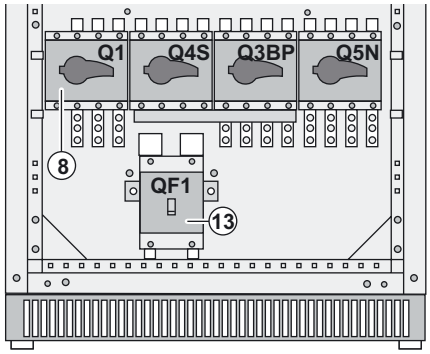
3.1 Shutting down a single UPS

The UPS remains energised unless it is shut down.



1 - Press a button to exit sleep mode.
2 - Confirm by pressing the function key **(38)** for 3 seconds.

The load is no longer protected by the UPS. It is supplied via the bypass.



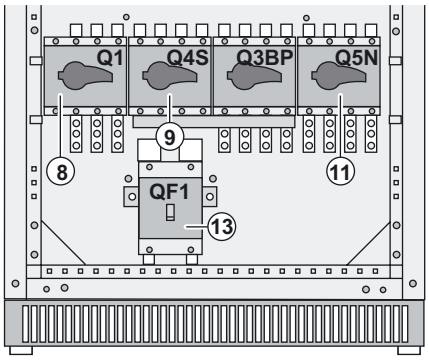
3 - Set the battery circuit-breaker QF1 **(13)** (or set the battery circuit-breakers of the auxiliary cabinets if any) to OFF.
4 - Set the input circuit-breaker Q1 **(8)** to OFF.

The charger no longer operates to keep the batteries fully charged.

5 - Open the upstream circuit-breakers of the Normal AC source and Bypass AC source to completely power off the UPS.

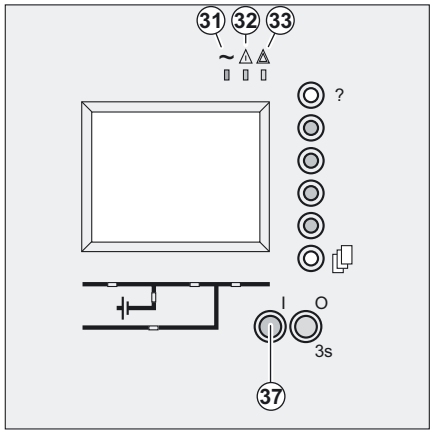
3.2 Restarting a single UPS

Check that switches Q4S (9) and Q5N (11) are closed. If this is the case, continue with this procedure, otherwise refer to paragraph 4.4 "Return to the Normal position, Single UPS".



1 - Set the Normal AC source input switch Q1 **(8)** to the ON position.
2 - Wait until the end of the start sequence.
3 - Set the battery circuit breaker QF1 **(13)** (or the battery circuit breakers in the auxiliary cabinets) to the ON position.
The UPS unit starts automatically.
LED **(31)** is ON.

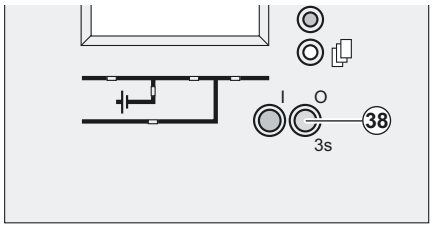
The load is protected by the UPS.



If LED **(31)** remains OFF, press the ON button **(37)**

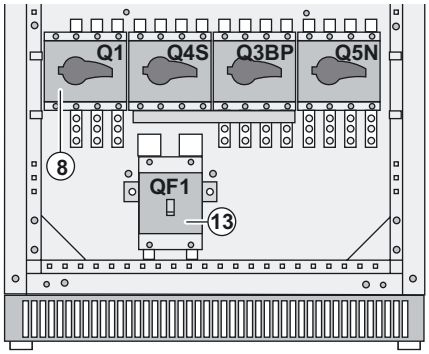
If LED **(31)** still remains OFF and either of LEDs **(32)** or **(33)** is ON, a fault has occurred (see section 4.1).

3.3 Shutting down a parallel configuration



1 - Press a button on each unit to exit sleep mode.
2 - Press the OFF button **(38)** on each unit for 3 seconds.

The load is no longer protected by the UPSs. It is supplied via the bypass.



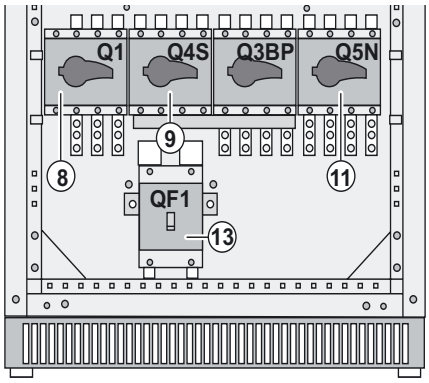
3 - Set the battery circuit breaker QF1 **(13)** in each UPS unit to the OFF position (or trip the battery circuit breakers in the auxiliary cabinets if applicable).
4 - Set the input switch Q1 **(8)** in each UPS unit to the OFF position.

The charger no longer operates to keep the batteries fully charged.

5 - Open the upstream circuit-breakers of Normal AC source and Bypass AC source to completely power off the installation.

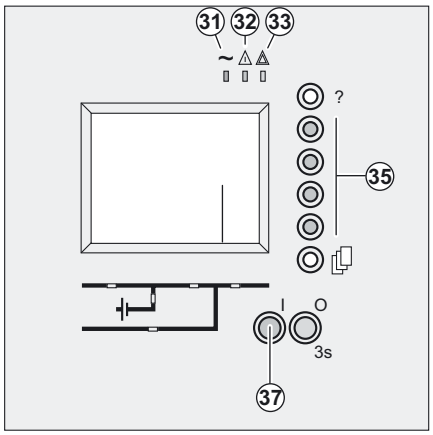
3.4 Restarting a parallel configuration

Check that switches Q4S (9) and Q5N (11) are closed. If this is the case, continue with this procedure, otherwise refer to paragraph 4.4 "Return to the Normal position, Parallel UPS...".



1 - Check that the Bypass AC source input switch Q4S in the external bypass cabinet is closed.
2 - Check that the output switch Q5N in the external bypass cabinet is closed.
3 - Check that the bypass switch Q3BP in the external bypass cabinet is open.

Then carry out steps 4 to 6 below on all the UPS units.
4 - Set the Normal AC source input switch Q1 **(8)** to the ON position.
5 - Wait until the end of the start sequence.
6 - Set the battery circuit breaker QF1 **(13)** (or the battery circuit breakers in the auxiliary cabinets) to the ON position.



The UPS units start automatically. On each unit, LEDs **(32)** and **(33)** go OFF and LED **(31)** goes ON.

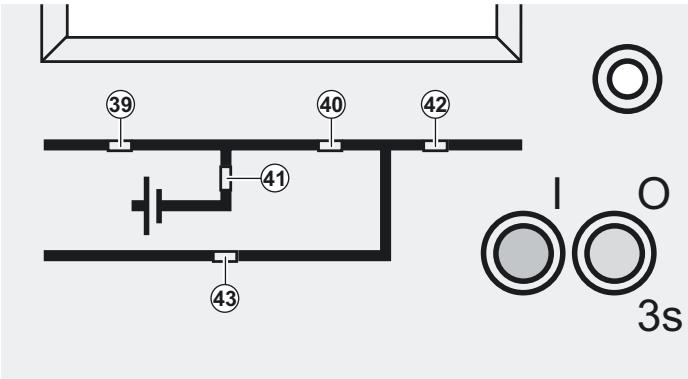
The load is protected by the UPSs.

If LED **(31)** remains OFF, press the ON button **(37)** on each UPS unit (the UPS is in manual start mode) and confirm if necessary by pressing the function key **(35)** marked ⇩.

If LED **(31)** still remains OFF and either of LEDs **(32)** or **(33)** is ON, a fault has occurred (see section 4.1).

3. Operation

3.5 Operation of mimic-panel LEDs



Single UPS start sequence on Normal AC input

Steps	Action	LED (39)	LED (40)	LED (41)	LED (42)	LED (43)
1	Q1 open	Off	Off	Off	Off	Off
2	Close Q1	green	Off	red	Off	red
3	Close QF1	green	Off	Off	Off	red
4	Close Q4S	green	Off	Off	Off	green
5	Close Q5N	green	Off	Off	green	green
6	Open Q3BP	green	Off	Off	green	green
7	Press ON button (37)	green	green	Off	green	Off

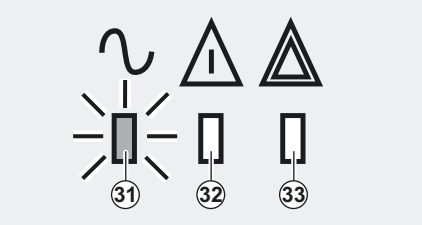
Single UPS start sequence on Bypass AC input

Steps	Action	LED (39)	LED (40)	LED (41)	LED (42)	LED (43)
1	Q4S open	Off	Off	Off	Off	Off
2	Close Q4S	red	Off	red	Off	green
3	Close Q5N	red	Off	red	green	green
4	Open Q3BP	red	Off	red	green	green
5	Close Q1	green	Off	red	green	green
6	Close QF1	green	Off	Off	green	green
7	Press ON button (37)	green	green	Off	green	Off

3.6 Operating modes

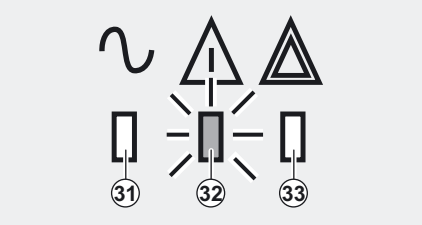
Normal (double conversion) mode

This is the standard operating mode, set by default in the factory. Two possible cases:



1 - Normal AC source available:
LED **(31)** is ON.

The load is protected by the UPS.



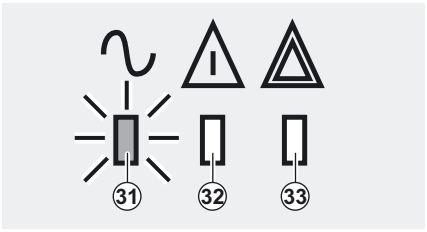
2 - Normal AC source not available:
LED **(32)** is ON.
The buzzer sounds intermittently.

The load is supplied by the UPS from battery power.

The display indicates any anomalies related to the AC source or the UPS as well as remedial action if applicable.
Press the function key **(35)** indicated by the display to turn the buzzer OFF.

ECO mode (single UPS only)

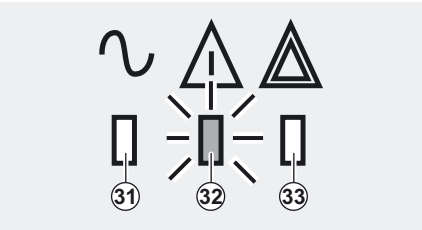
The main advantage of this mode is that it reduces the consumption of electrical power.
ECO mode may be selected exclusively via the control panel on the UPS.



Three possible cases:

1 - Bypass AC source available:
LED **(31)** is ON.
The load is supplied in ECO mode.

2 - Bypass AC source not available:
LED **(31)** is ON.
The buzzer sounds intermittently.
The load is automatically supplied in normal mode via the Normal AC input.



3 - Both normal and Bypass AC sources not available or out of tolerance:
LED **(32)** is ON.
The buzzer sounds intermittently.
The load is supplied by the UPS from battery power.

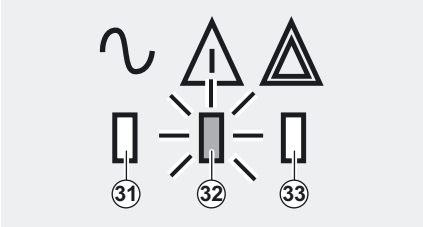
The display indicates the UPS operating status conditions and the required action.

3. Operation

3.7 Load on battery power

The load continues to be protected by the UPS when the Normal AC source is not available. Power is supplied by the battery.

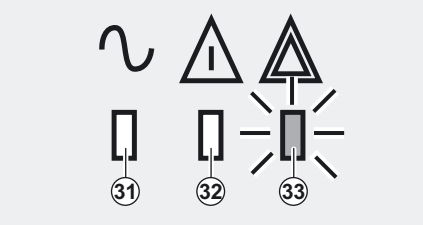
Transfer to battery power



LED **(32)** is ON.
The buzzer sounds intermittently.

The load is supplied by the battery.

End of battery power



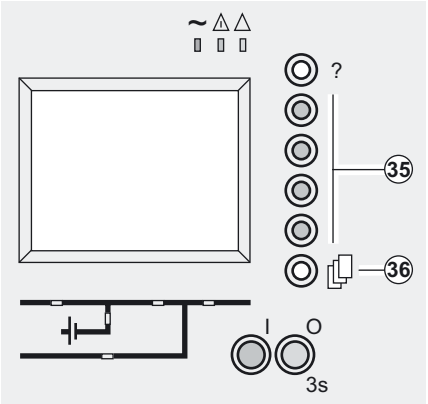
LED **(33)** is ON.
The buzzer sounds intermittently.

The load is transferred on the Bypass AC input if it is present.

3.8 UPS personalisation

Access to the personalisation functions

Personalisation must be carried out with switches Q1 (8) and Q5N (11) open (OFF) and switches Q4S (9) and Q3BP (10) closed (ON).



1 - Press the menu key **(36)** .
2 - Select "Settings", then "Personalisation" using the function keys **(35)** ↑ or ↓.
3 - Confirm by pressing the function key **(35)** ↵.
4 - Enter the password by successively selecting each icon using the corresponding function key.
5 - Confirm by pressing the function key **(35)** ↵.
6 - To save the personalisation settings, confirm by pressing the function key **(35)** ↵.

The password Ø Ø Ø ↵ is factory set.

To change the password, see the Settings menu.

Operating mode

Function	Factory setting	Options
UPS operating mode	NORMAL	ECO
UPS automatic start	Disabled	Enabled
Authorised number of starts	4	1 to 255
Delay before reset of number of executed automatic starts	4 seconds	1 to 60 seconds

Frequency

UPS output frequency	50 Hz	60 Hz
Tolerance for Bypass AC source	8 %	0.5 - 1 - 2 - 4 %
Synchronisation speed with Bypass AC source	2 Hz / s	1 Hz / s

Automatic bypass

Transfer to Bypass AC source	Enabled	Disabled - disabled when limiting
Transfer to bypass with Bypass AC source out of tolerances	Enabled	Disabled

Battery

Low battery warning threshold if battery monitor inactive	40% remaining backup time	20 - 60 - 80 % remaining backup time
Low battery warning threshold if battery monitor active	4 minutes of battery backup time	1 to X minutes of battery backup time
Interval between two battery tests	30 days	1 to 180 days

3. Operation

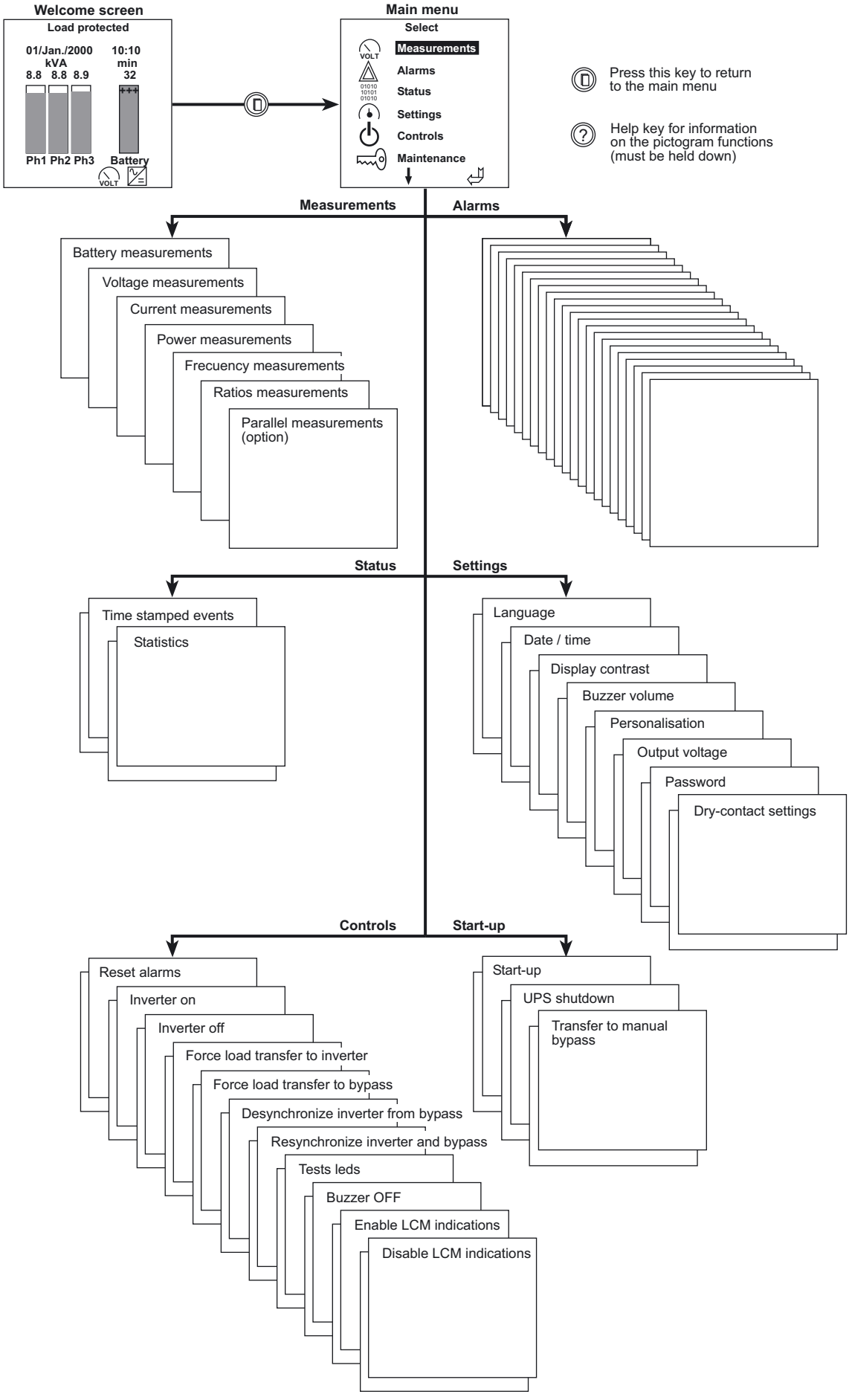
3.9 Relay contacts (communications card)

	Inputs	Factory setting	Options (available on all contacts)
1.A		UPS ON	- Room temperature fault - Transfer to bypass disabled - Transfer to bypass disabled if Bypass AC source out of tolerance - Desynchronise UPS from Bypass AC source
1.B		UPS OFF	

	Outputs	Factory setting	Options (available on all contacts)
1.1		General alarm (1)	- Overload - PFC fault - Inverter fault - Charger fault - Automatic-bypass fault - Bypass AC source out of tolerance - Battery-temperature fault - Fan fault - Emergency power off activated - Battery circuit breaker(s) open (at least one) - Phase-sequence fault on normal or Bypass AC source - Blown fuse(s) - Transfer to Bypass AC source disabled - Operation in ECO mode - UPS on manual bypass
1.2		Battery fault	
1.3		Load on NORMAL source	
1.4		Load on automatic bypass	
1.5		Load on battery power	
1.6		Low battery warning	

The indications 1.X become 2.X for a second identical card in the UPS.
Contacts are of the NO (normally open) type.
(1) The general alarm can be tested by opening the battery circuit breaker.

3.10 Display functions



4. Maintenance

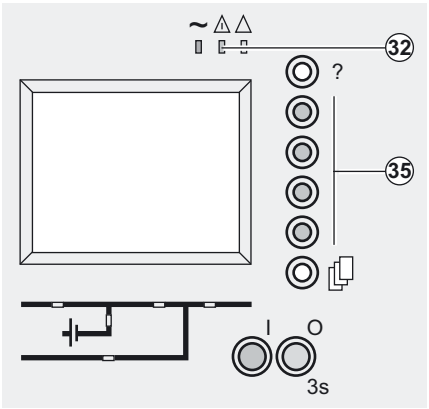
4.1 Identification of alarms

Alarm conditions are identified by LEDs **(31), (32), (33)** and the buzzer.

LED (31)	LED (32)	LED (33)	Buzzer	Signification
-		-	Intermittent	Normal AC source not available
-	-		Intermittent	UPS shut down following end of battery power
-	-		Intermittent	UPS shut down on fault requiring servicing by after-sales support

Detailed information on all alarms is supplied on the display.
1 - On the screen, select the alarm for which information is required.
2 - Hold down the corresponding function key to display the possible causes of the fault and the required action.

4.2 Life Cycle Monitoring (LCM)



◗ The "Life Cycle Monitoring" function provides UPS maintenance advice to guarantee installation availability for the user.

◗ The display gives 3 messages enabling the following to be identified:
- The end of the contractual legal warranty: "**End of warranty check recommended**".
- Regular maintenance requirements and the end of service life for consumable components: "**Technical check recommended**".
- The end of the battery service life: "**Battery check required**".

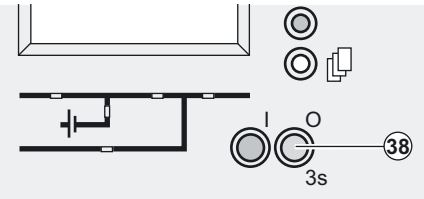
In addition to these messages, the minor fault LED **(32)** lights up and the buzzer sounds.
These messages can be deleted by pressing the function key **(35)**. This also causes LED **(32)**, to go out, the buzzer to stop and the removal of the "Global Alarm" remote signalling.

To completely disable LCM indications, use the display to enter the password required to disable the function.

4.3 UPS isolation

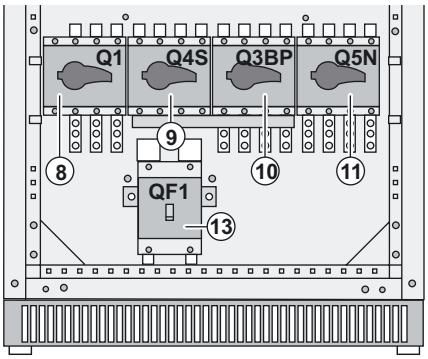
Single UPS

To isolate the UPS from the electrical power source and supply the load directly by the normal or Bypass AC source, follow the instructions below.



1 - Press a button to exit sleep mode.
2 - Shut down the UPS by pressing the OFF button **(38)** for 3 seconds.

The load is no longer protected by the UPS.



3 - Set bypass switch Q3BP **(10)** to ON.
4 - Set output switch Q5N **(11)** to OFF.
5 - Set the battery circuit-breaker QF1 **(13)** (or set the battery circuit-breakers of the auxiliary cabinets if any) to OFF.
6 - Set the input circuit-breaker Q1 **(8)** to OFF.
7 - Set the input circuit-breaker Q4S **(9)** to OFF.
8 - Wait until the display and LEDs go off.

The load is no longer protected by the UPS, but continues to be supplied with AC power.
UPS maintenance or servicing can now be carried out.

Frequency converter

1 - Press a button to exit sleep mode.
2 - Shut down the UPS by pressing the OFF button **(38)** for 3 seconds.

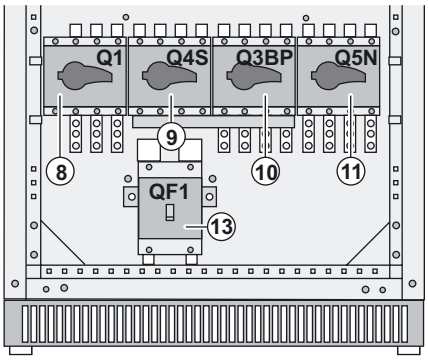
The load is no longer protected by the unit.

3 - Set the battery circuit-breaker QF1 **(13)** (or set the battery circuit-breakers of the auxiliary cabinets if any) to OFF.
4 - Set the input circuit-breaker Q1 **(8)** to OFF.
5 - To ensure operator safety, open all Q4S **(9)** and Q5N **(11)** switches.

UPS maintenance or servicing can now be carried out.

UPS operating in ECO mode

If supplied by the network via the Bypass AC channel:

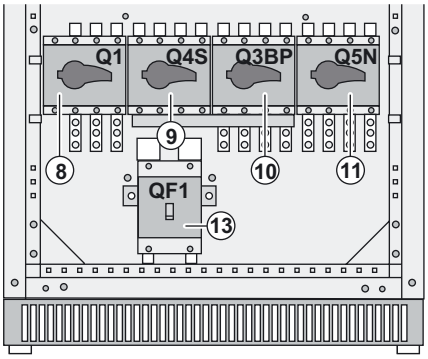


1 - Check that the load is operating via the Bypass AC input.
2 - Set bypass switch Q3BP **(10)** to ON.
3 - Set output switch Q5N **(11)** to OFF.
4 - Set the battery circuit-breaker QF1 **(13)** (or set the battery circuit-breakers of the auxiliary cabinets if any) to OFF.
5 - Set the input circuit-breaker Q1 **(8)** to OFF.
6 - Set the input circuit-breaker Q4S **(9)** to OFF.

The load is no longer protected by the UPS, but continues to be supplied with AC power.
UPS maintenance or servicing can now be carried out.

4. Maintenance

If the load is supplied by the UPS with Bypass AC source present:

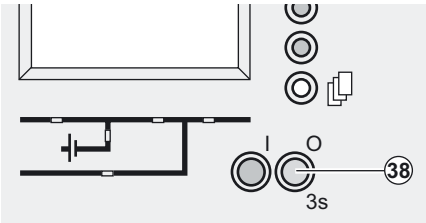


1 - Press a button to exit sleep mode.
2 - Shut down the UPS by pressing the OFF button **(38)** for 3 seconds.
3 - Set bypass switch Q3BP **(10)** to ON.
4 - Set output switch Q5N **(11)** to OFF.
5 - Set the battery circuit-breaker QF1 **(13)** (or set the battery circuit-breakers of the auxiliary cabinets if any) to OFF.
6 - Set the input circuit-breaker Q1 **(8)** to OFF.
7 - Set the input circuit-breaker Q4S **(9)** to OFF.
8 - Wait until the display and LEDs go off.

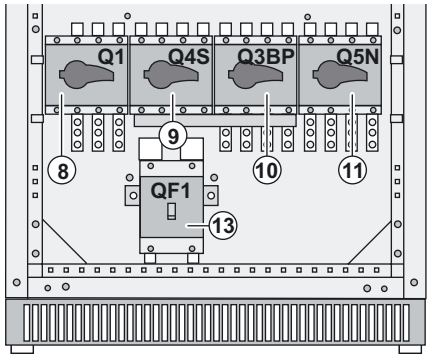
The load is no longer protected by the UPS, but continues to be supplied with AC power.
UPS maintenance or servicing can now be carried out.

Parallel UPS configuration without external bypass cabinet

Shutdown and isolation of the first UPS unit:



1 - Check that the two UPS units are operating.
2 - Press a button to exit sleep mode.
3 - Shut down the UPS by pressing the OFF button **(38)** for 3 seconds.



4 - Set output switch Q5N **(11)** to OFF.
5 - Set the battery circuit-breaker QF1 **(13)** (or set the battery circuit-breakers of the auxiliary cabinets if any) to OFF.
6 - Set the input circuit-breaker Q1 **(8)** to OFF.
7 - Set the input circuit-breaker Q4S **(9)** to OFF.
8 - Wait until the display and LEDs go off.

The load is still protected by the other UPS unit.
Maintenance or servicing can now be carried out on the UPS unit that has been shut down.

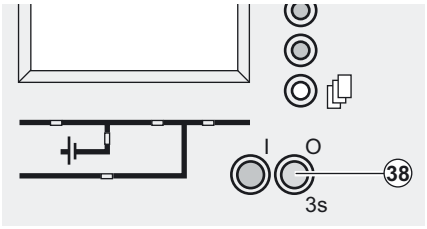
Shutdown and isolation of the second UPS unit:

1 - Press a button to exit sleep mode.
2 - Shut down the UPS by pressing the OFF button **(38)** for 3 seconds.
3 - Set bypass switch Q3BP **(10)** to ON.
4 - Set output switch Q5N **(11)** to OFF.
5 - Set the battery circuit-breaker QF1 **(13)** (or set the battery circuit-breakers of the auxiliary cabinets if any) to OFF.
6 - Set the input circuit-breaker Q1 **(8)** to OFF.
7 - Set the input circuit-breaker Q4S **(9)** to OFF.
8 - Wait until the display and LEDs go off.

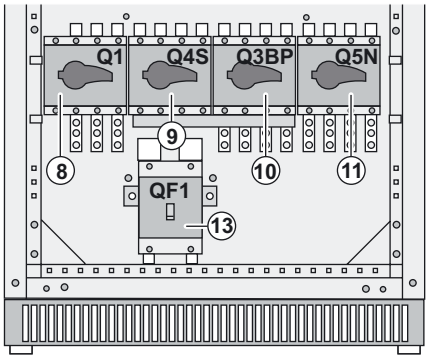
The load is no longer protected by the UPS, but continues to be supplied with AC power.
UPS maintenance or servicing can now be carried out.

Parallel UPS configuration with external bypass cabinet

Shutdown and isolation of one UPS unit



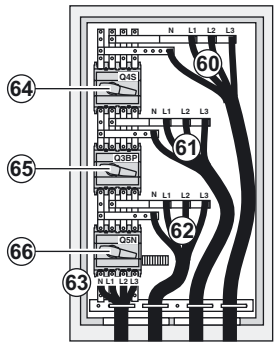
1 - First check that the total capacity of the remaining UPS units is sufficient to supply the connected load.
2 - Press a button to exit sleep mode.
3 - Shut down the UPS by pressing the OFF button **(38)** for 3 seconds.



4 - Set output switch Q5N **(11)** to OFF.
5 - Set the battery circuit-breaker QF1 **(13)** (or set the battery circuit-breakers of the auxiliary cabinets if any) to OFF.
6 - Set the input circuit-breaker Q1 **(8)** to OFF.
7 - Set the input circuit-breaker Q4S **(9)** to OFF.
8 - Wait until the display and LEDs go off.

The load is still protected by the other UPS units.
Maintenance or servicing can now be carried out on the UPS unit that has been shut down.

Shutdown and isolation of all the UPS units:



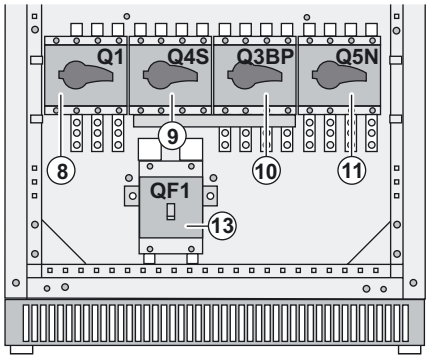
1 - On each UPS unit, press a button to exit sleep mode.
2 - Shut down each UPS unit by pressing their OFF buttons **(38)** for 3 seconds.
3 - Set switch Q3BP **(65)** in the external bypass cabinet to ON.
4 - Set switch Q5N **(66)** in the external bypass cabinet to OFF.
5 - Set switch Q4S **(64)** in the external bypass cabinet to OFF.
6 - Set output switch Q5N **(11)** of each UPS unit to OFF.
7 - Set the battery circuit-breaker QF1 **(13)** of each UPS unit (or set the battery circuit-breakers of the auxiliary cabinets if any) to OFF.
8 - Set the input circuit-breaker Q1 **(8)** of each UPS unit to OFF.
9 - Set switch Q4S **(9)** of each UPS unit to OFF.
10 - Wait until the control electronics of all UPS units have fully shut down.

The load is no longer protected by the UPS, but continues to be supplied with AC power.
Maintenance or servicing can now be carried out.

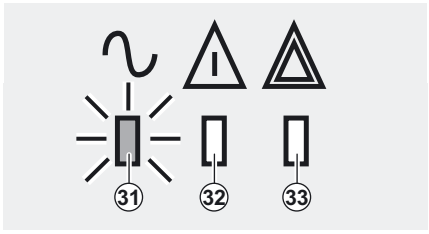
4. Maintenance

4.4 Return to the normal position

Single UPS



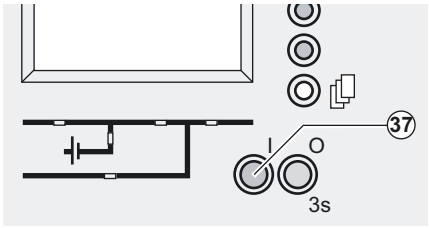
1 - Check that bypass switch Q3BP **(10)** is ON and that all other switches are OFF.
2 - Set input switch Q4S **(9)** to ON.
3 - Set output switch Q5N **(11)** to ON.
4 - Wait until the display goes on and check that there are no faults on the static-switch on the bypass line.
5 - Set bypass switch Q3BP **(10)** to OFF.
6 - Set the input circuit-breaker Q1 **(8)** to ON.
7 - Set the battery circuit-breaker QF1 **(13)** (or set the battery circuit-breakers of the auxiliary cabinets if any) to ON.



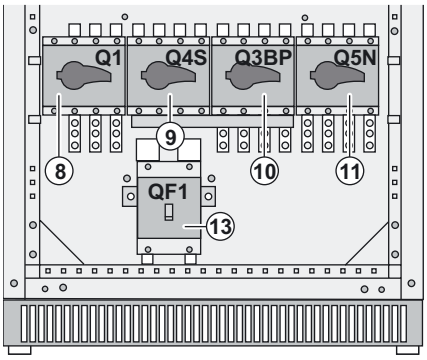
The UPS unit starts automatically.
LED (31) is ON.

If LED **(31)** remains OFF, press the ON button **(37)**
(the system is in manual start mode).

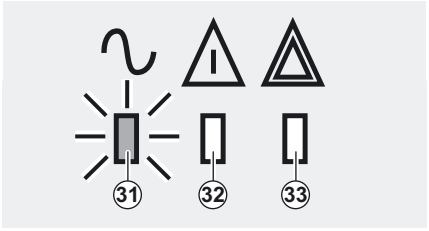
If LED **(31)** still remains OFF and either of LEDs **(32)** or **(33)** is ON, a fault has occurred (see section 4.1).



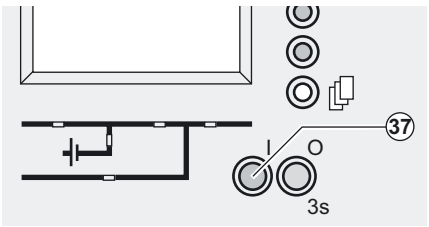
Frequency converter



1 - Check that all switches are set to OFF.
2 - Set the input circuit-breaker Q4S **(9)** to ON (check that no cable is connected on phase 1, phase 2 and phase 3).
3 - Set the input circuit-breaker Q1 **(8)** to ON.
4 - Set output switch Q5N **(11)** to ON.
5 - Set the battery circuit-breaker QF1 **(13)** (or set the battery circuit-breakers of the auxiliary cabinets if any) to ON.



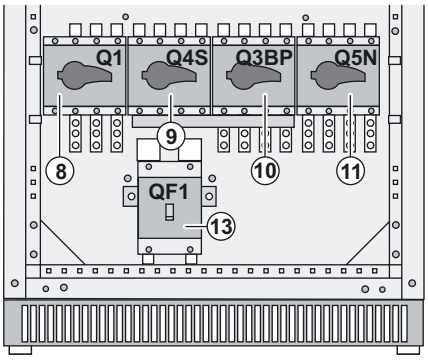
6 - Press the ON button **(37)**.
If LED **(31)** still remains OFF and either of LEDs **(32)** or **(33)** is ON, a fault has occurred (see section 4.1).



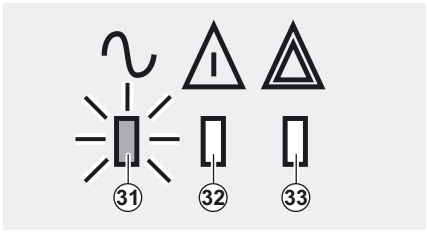
Parallel UPS configuration without external bypass cabinet

Restart the UPS unit for which switch Q3BP (10) is ON and the other switches are OFF.

Caution. It is imperative to restart this UPS unit. Otherwise, load power is cut if the other two UPSs are shut down.



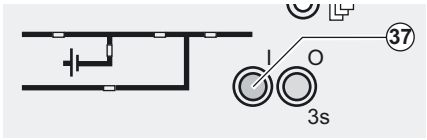
1 - Set the input circuit-breaker Q4S **(9)** to ON.
2 - Set output switch Q5N **(11)** to ON.
3 - Check that the UPS is listed by the display, then confirm by pressing the function keys **(35)**.
4 - Set bypass switch Q3BP **(10)** to OFF.
5 - Set the input circuit-breaker Q1 **(8)** to ON.
6 - Set the battery circuit-breaker QF1 **(13)** (or set the battery circuit-breakers of the auxiliary cabinets if any) to ON.



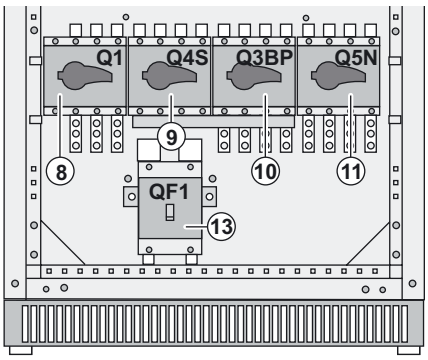
The UPS unit starts automatically. LED (31) is ON.
The load is protected by the UPS.

If LED **(31)** remains OFF, press the ON button **(37)**

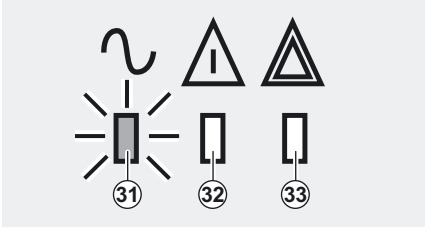
If LED **(31)** still remains OFF and either of LEDs **(32)** or **(33)** is ON, a fault has occurred (see section 4.1).



Restart the UPS unit for which all switches are set to OFF.



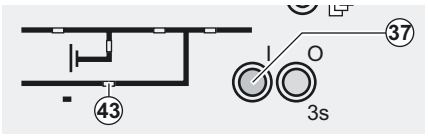
1 - Set the input circuit-breaker Q4S **(9)** to ON.
2 - Set output switch Q5N **(11)** to ON.
3 - Check that all the UPS units present in the installation are included in the list on the display and confirm by pressing the function buttons **(35)**.
4 - Set the input circuit-breaker Q1 **(8)** to ON.
5 - Set the battery circuit-breaker QF1 **(13)** (or set the battery circuit-breakers of the auxiliary cabinets if any) to ON.



The UPS restarts and LED (31) is ON.

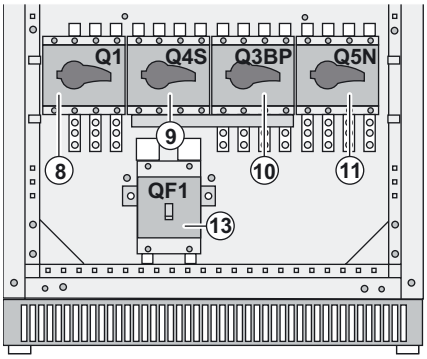
If LED **(31)** remains OFF, press the ON button **(37)**
(the system is in manual start mode).

If LED **(31)** still remains OFF and either of LEDs **(32)** or **(33)** is ON, a fault has occurred (see section 4.1).

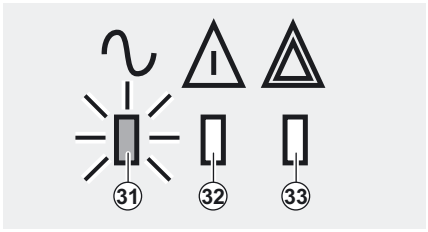


4. Maintenance

Parallel UPS configuration with external bypass cabinet



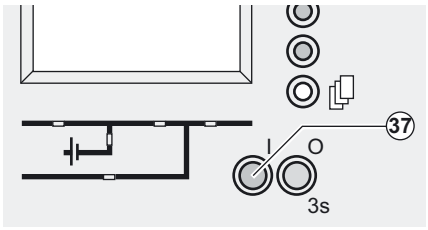
1 - Check that all switches on the UPS units are set to OFF.
2 - Set switch Q4S in the external bypass cabinet to ON.
3 - Set switch Q4S **(9)** on each UPS unit to ON.
4 - Set output switch Q5N **(11)** on each UPS unit to ON.
5 - Check that all the UPS units present in the installation are included in the list on the display and confirm by pressing the function button **(35)** on each UPS unit.
6 - Set switch Q5N in the external bypass cabinet to ON.
7 - Set switch Q3BP in the external bypass cabinet to OFF.
8 - Set the input circuit-breaker Q1 **(8)** on each UPS unit to ON.
9 - Set the battery circuit-breaker QF1 **(13)** on each UPS unit to ON (or set the battery circuit-breakers of the auxiliary cabinets if any)



The UPS units start automatically. LED (31) is ON.
The load is protected by the UPS.

If LED **(31)** remains OFF, press the ON button **(37)** on each UPS unit (the system is in manual start mode).

If LED **(31)** still remains OFF and either of LEDs **(32)** or **(33)** is ON, a fault has occurred (see section 4.1).



4.5 Training centres

To allow you to use APC by Schneider Electric products effectively and carry out basic maintenance, we offer a complete range of technical training courses in English and French.

Schneider Critical Power & Cooling Services 50 Hz training centres

France Training Centre
140, Avenue Jean Kuntzmann
Innovallée
38334 - St Ismier Cedex - FRANCE

Tél : +33 (0)4 76 18 34 14
Fax : +33 (0)4 76 18 45 21

Denmark Training Centre
Silcon Allé
6000 Kolding
Denmark

Tél : +45 72 19 03 12

Singapore Training Centre
10 Ang MO Kio Street 65, #03-06/10
Techpoint Building
Singapore 569059

Tél : +65 6389 6792

China Training Centre
Floor 3, Building B10, Universal Plaza
10 juxianqiao Road
Chaoyang District, Beijing 100016

Tél : +86 10 6431 8899

Schneider Critical Power & Cooling Services 50-60 Hz training centre

Brazil Training Centre
Al. Xingu, 850-Alphaville
06455-030 Barueri, São Paulo
Brazil

Tél : +55 11 4689-8600

Internet : http://powerlearning.apc.com
Catalogue and registration available on line.

5. Environment

APC by Schneider Electric has implemented an environmental-protection policy.
Products are developed according to an eco-design approach.

Substances

This product does not contain CFCs, HCFCs or asbestos.

Packing

To improve waste treatment and facilitate recycling, separate the various packing components.
The cardboard we use includes over 50% of recycled cardboard.
Sacks and bags are made of polyethylene.
Packing materials are recyclable and bear the appropriate identification symbol

.

Material	Abbreviation	Symbol number
Polyethylene terephthalate	PET	01
High-density polyethylene	HDPE	02
Polyvinyl chloride	PVC	03
Low-density polyethylene	LDPE	04
Polypropylene	PP	05
Polystyrene	PS	06

Follow all local regulations for the disposal of packing materials.

End of life

APC by Schneider Electric will process products at the end of their service life in compliance with local regulations.
APC by Schneider Electric works with companies in charge of collecting and eliminating our products at the end of their service life.

Product
The product is made up of recyclable materials.
Dismantling and destruction must take place in compliance with all local regulations concerning waste.
At the end of its service life, the product must be transported to a processing center for electrical and electronic waste.
Make the product unusable by cutting the internal supply cables.

Battery
The product contains lead-acid batteries that must be processed according to applicable local regulations concerning batteries.
The battery may be removed to comply with regulations and in view of correct disposal.
The "Material Safety Data Sheets" (MSDS) for the batteries are available on our web site*.

(*) For more information or to contact the Product Environmental manager, use the "Environmental Form" on the site: http://environment.apc.com

Backfeed option

This option opens the Bypass AC input or the Normal AC input if power fails. This option is mandatory to meet standard IEC 62040-1-2.
If an external backfeed protection system is used, it must comply with the requirements indicated in Annex L of standard IEC 62040-1-2.

NMC (Network Management Card) option

This option is a communications card for supervision and protection of a three-phase device. Each UPS can be equipped with a maximum of four NMC communications cards.

Optional communications card with additional power relay

The UPS is already equipped with a relay communications card. But it is possible, with this option, to add another card with programmable power-relay functions.

Optional serial communications card

This option is an RS232 or RS485 serial communications card operating under the JBUS protocol.

Telpac Power Services option

This option consists of a communications card operating under the JBUS protocol for Teleservice functions.

AS4I option

This option consists of a low-power relay card for shut-off and scheduling functions.

Multislot option

This option consists of communications cards to concentrate the communication of two parallel-connected UPSs.

External synchronisation module option

With this option, a SYNIN communications card and two circuit breakers are added to each UPS unit. The external synchronisation module issues a reference frequency used to synchronise the UPS units. For more information, see document no. 34000346.

Check the different input/output signal levels (LV, ELV, SELV) on the optional communication cards (4) and use appropriate wiring.

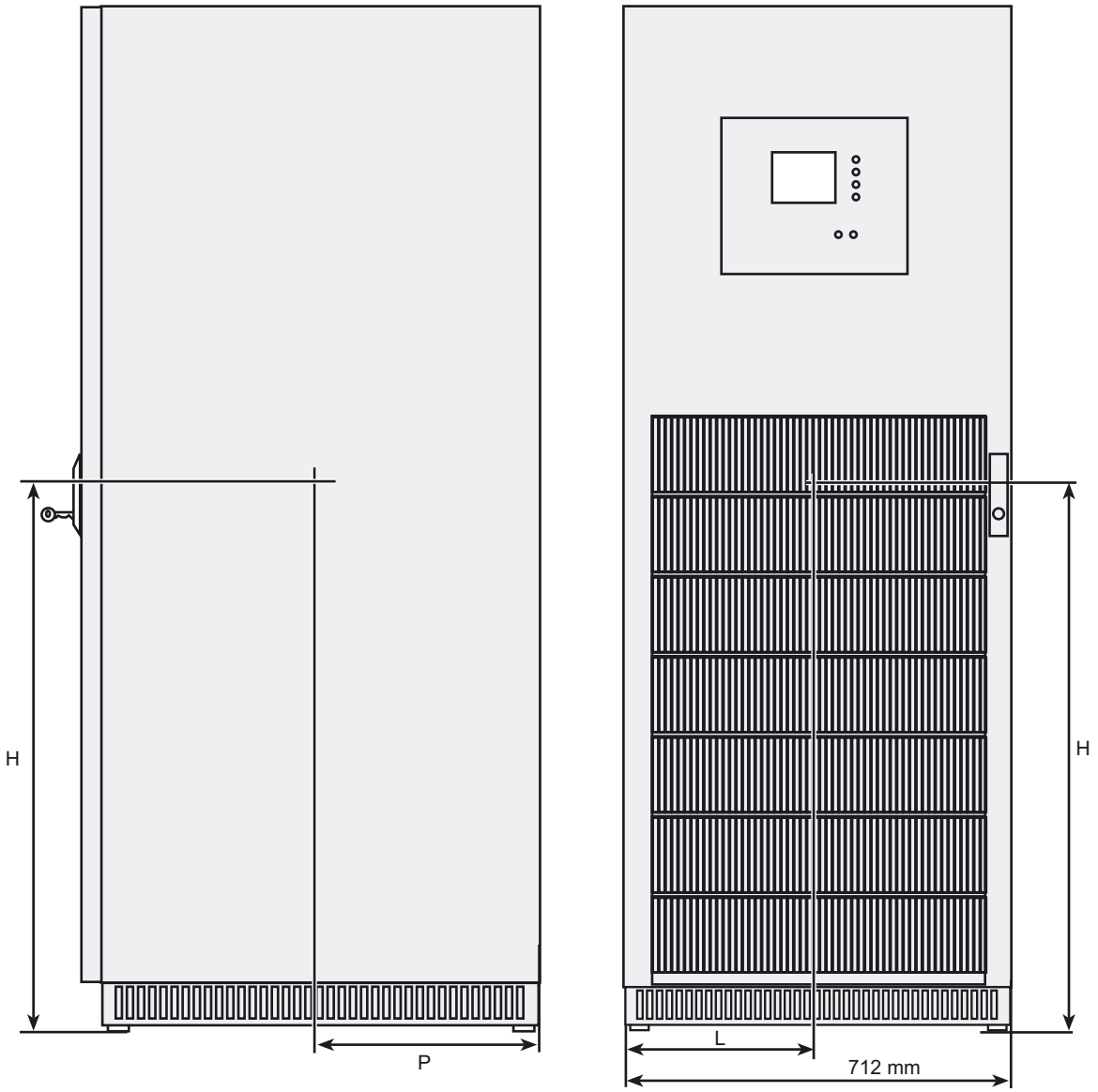
IP32 option

This option protects the UPS against solid objects larger than 2.5 mm and falling drops of water from up to 15° from vertical.
For roof installation, See “IP32 installation”, page 67.

7. Appendices

7.1 Technical sheets

Center of gravity



UPS power rating (kVA)	H (mm)	W (mm)	D (mm)
20/30/40/60 kVA	950	350	360
80/100/120 kVA	950	350	360

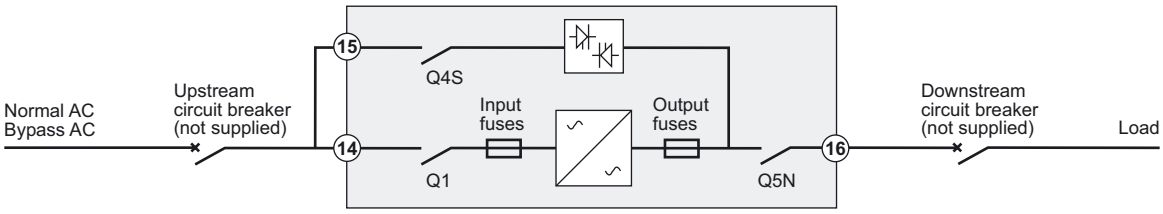
Tip angle (to the rear)

UPS power rating (kVA)	UPS on feet	UPS on pallet
20/30/40/60 kVA	17.5°	22°
80/100/120 kVA	17.5°	22°

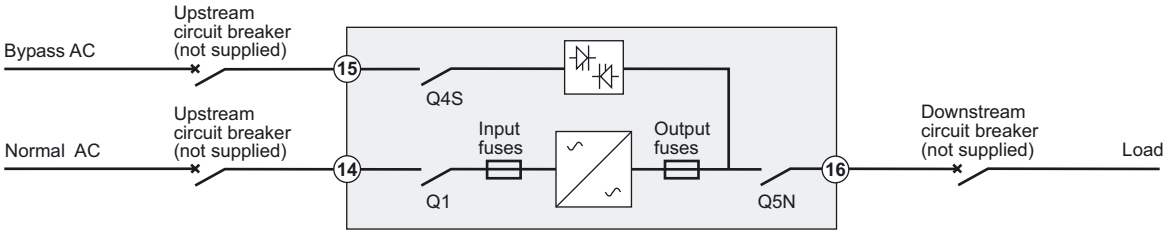
Electrical characteristics

Selection of protection devices

UPS unit with common normal and Bypass AC inputs

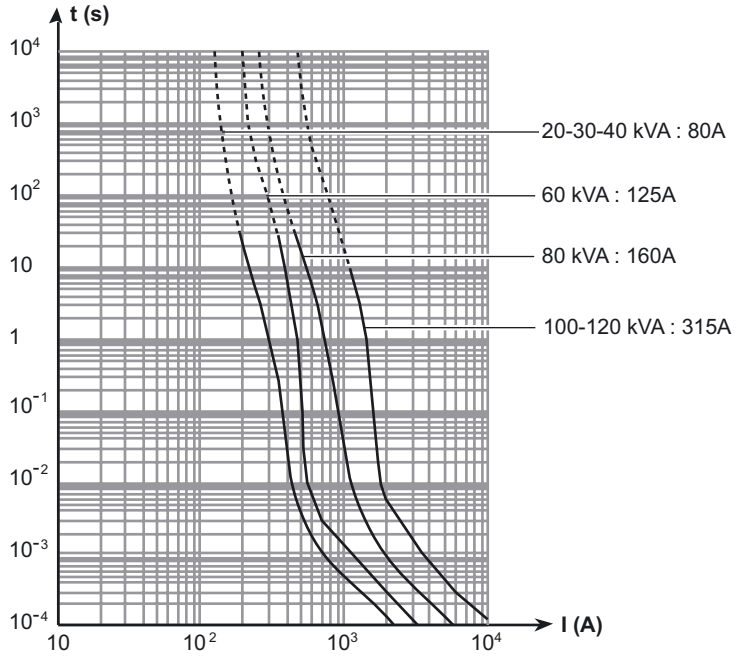


UPS unit with separate normal and Bypass AC inputs



When sizing the upstream circuit breakers, the parameters presented below must be taken into account:

Time/current curves for UPS input and output fuses:



UPS short-circuit current with inverter coupled and By-pass AC source out of tolerances:

Sn	20 kVA	30 kVA	40 kVA	60 kVA	80 kVA	100 kVA	120 kVA
In	29 A	43 A	58 A	87 A	115 A	144 A	173 A
Limitation	190 A	190 A	190 A	240A	360 A	480 A	480A

7. Appendices

Line current values

Rated power of each UPS unit	Continuous input current at U=400V	Input current at U=400V overload = 1.25 In limited to 10 min.	Input current at U=400V overload = 1.5 In limited to 1 min.	Input/output fuse ratings
20 kVA	29 A	36 A	44 A	80 A
30 kVA	43 A	55 A	65 A	80 A
40 kVA	58 A	72 A	87 A	80 A
60 kVA	87 A	108 A	130 A	125 A
80 kVA	115 A	145 A	174 A	160 A
100 kVA	144 A	181 A	217 A	315 A
120 kVA	173 A	217 A	260 A	315 A

Input / output characteristics

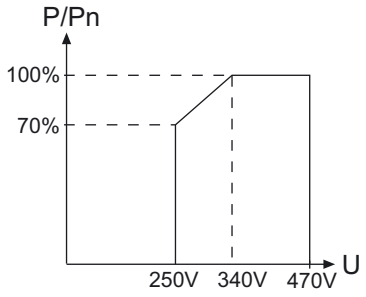
Normal AC source / Bypass AC source

	Standard UPS	UPS with backfeed protection
Uin	380 to 443 V	380 to 443 V
Input voltage range permitted by the standard according to the curve below	250 to 470 V	340 to 470 V
Fin	45 to 65 Hz	45 to 65 Hz

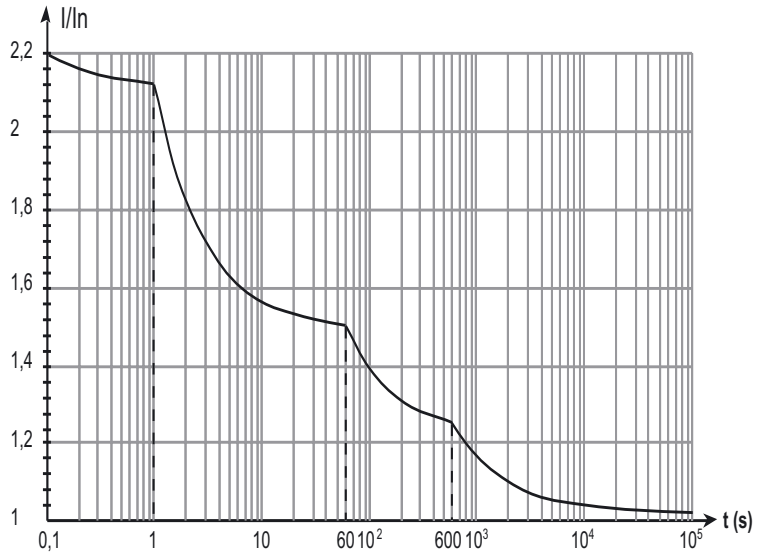
Load output

Uout	380 V	400 V	415 V	+ 3% - 3%

Power supplied as a function of input voltage



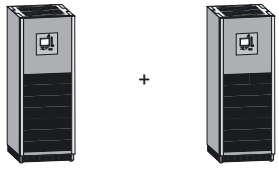
Permissible UPS overloads as a function of time



Maximum allowable power for parallel UPS units

Without external bypass cabinet:

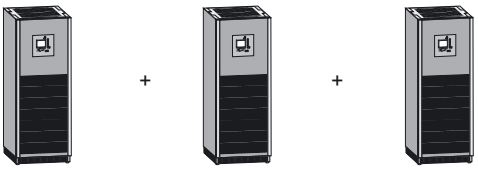
= 1 x Pn



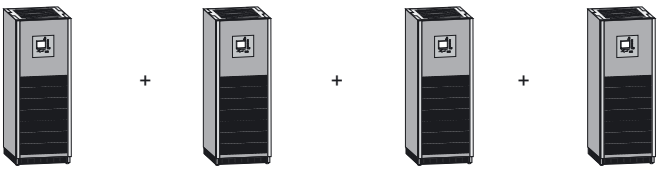
+ = 1 x Pn

With external bypass cabinet:

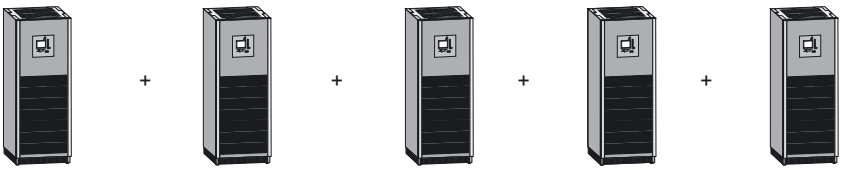
+ = 2 x Pn



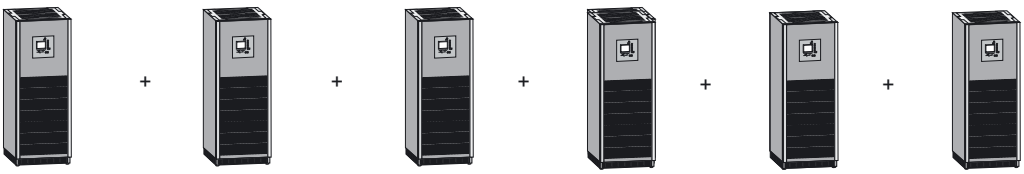
+ + = 3 x Pn



+ + + = 4 x Pn



+ + + + = 4 x Pn



+ + + + + + = 4 x Pn

7. Appendices

The maximum allowable power for 4 parallel UPS units is limited to 4 x Pn.

Restrictions to parallel operation

	Single UPS	Parallel UPS
EMC level	Category C3	Category C3
ECO mode	Yes	No
Frequency converter	Yes	Yes (for two UPSs)
Compatibility with the synchronisation module	Yes	Yes

(*) : except in ECO mode or bypass mode.

Thermal characteristics

- The operating temperature range is 0°C to +40°C (0°C to 30°C for overload conditions), however optimum operation is within the +20°C to +25°C range.
- Battery backup time is adversely affected by high and low temperatures. It is significantly reduced at temperatures under 10°C.

Above 25°C, battery service life is cut in half every 10°C. Above 40°C, battery manufacturers no longer guarantee operation due to the risk of thermal runaway.

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UPS power rating	Heat losses	Recommended air throughput
20 kVA	2.4 kW	1 332 m^3/h
30 kVA	3 kW	1 332 m^3/h
40 kVA	3.4 kW	1 332 m^3/h
60 kVA	4.9 kW	1 332 m^3/h
80 kVA	5.8 kW	2 556 m^3/h
100 kVA	7 kW	2 556 m^3/h
120 kVA	8.4 kW	2 556 m^3/h

Air enters through the bottom.
Air exits through the top.

General characteristics of MGE™ Galaxy™ 5000 UPSs

UPS power in kVA	20	30	40	60	80	100	120
Normal AC input							
Number of conductors	3 phases						
Reference voltage at Pn	380 V to 443 V						
Reference frequency	45 Hz to 65 Hz						
THDI	Typically 3% at Pn						
Power factor	>0.99						
Bypass AC input							
Number of conductors	3 phases + neutral						
Reference voltage at Pn	380 V to 443 V						
Reference frequency	45 Hz to 65 Hz						
Load output							
Number of conductors	3 phases + neutral						
Set phase-to-phase voltages	380 V or 400 V or 415 V						
Set phase-to-neutral voltages	220 V or 230 V or 240 V						
Voltage variation	± 1%						
Adjustable frequencies and tolerance (on battery power)	50 Hz or 60 Hz ± 0.1 Hz						
Voltage variation for 0 to 100% load step change	± 1%						
Permissible overloads	150% for 1 minute, 125% for 10 minutes						
THDU Ph-to-Ph and Ph-to-N for nonlinear load	< 2% Ph-to-Ph						
Battery							
Standard battery technology	Sealed lead-acid battery (gas-recombination)						
Inverter							
Active power (kW)	16	24	32	48	64	80	96
Heat losses in kW(1) Heat losses in calories/s	2.7 648	3 720	3.54 850	4.7 1128	5.31 1275	6.5 1560	7.64 1834
Storage temperature range	-25°C to +45°C						
Operating temperature range at Pn	0°C to 40°C						
Relative humidity	20% to 95%						
Maximum operating altitude without derating	< 1000 m						

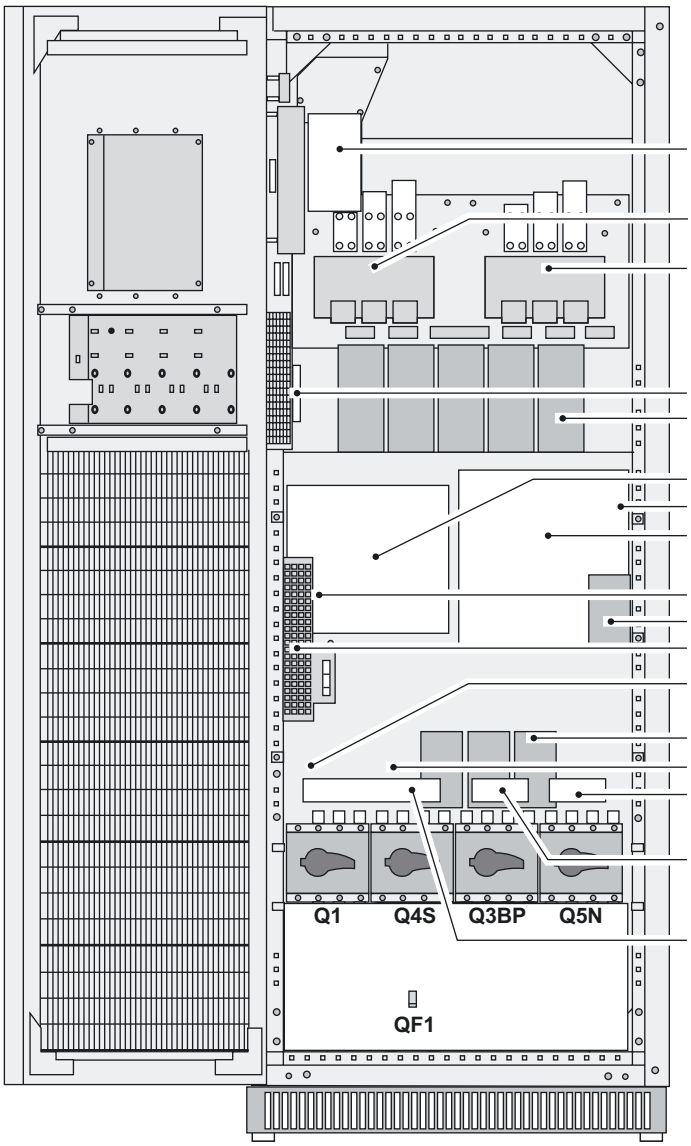
(1)Losses are calculated for n-1%.

7. Appendices

General characteristics of MGE™ Galaxy™ 5000 UPSs (cont.)

UPS power in kVA	20	30	40	60	80	100	120
Noise level (dBa)	65	65	65	65	63	63	63
Width	710 mm						
Depth	850 mm						
Height	1900 mm						
Weight (kg)	400	400	400	400	520	520	520
Recommended upstream residual current protection	1 A						
Product standards	IEC 62040						
Safety standards	IEC 62040-1-2						
Protection standards	IEC 62040-3						
EMC standards	IEC 62040-2						

UPS components



IGBT charger + neutral leg

IGBT PFC

IGBT inverter

EXTN board
DC capacitors

Normal AC SS board + battery
Output fuse
Bypass AC SS and inverter board

DALIN board
Output capacitors
ALIN board
Input fuse

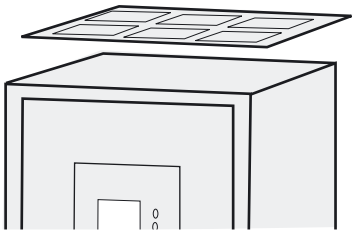
Input capacitors
Inductor and SS fans
Output-filter board

ETON board

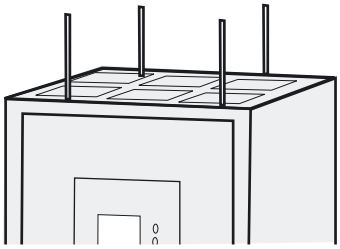
Input-filter board

7.2 Options

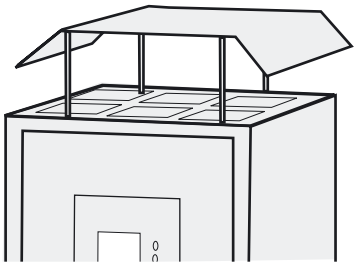
IP32 installation



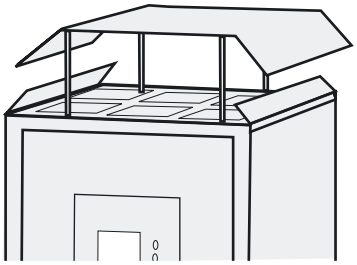
Install the protection cover above the UPS.



Install the spacers. The longer spacers must be positioned toward the front of the UPS.



Install the roof.



Install the side deflectors.

7. Appendices

7.3 Glossary

Backup time	Time that the connected loads can operate on battery power.
Bypass AC source	Source supplying the bypass line. The load can be transferred to the bypass line if an overload occurs on the UPS output, for maintenance or in the event of a malfunction.
ECO mode	Operating mode by which the load is supplied directly by the AC source if it is within the tolerances defined by the user. This mode reduces the consumption of electrical power.
External synchronisation port	Input used to synchronise the UPS to an external signal.
Fin	UPS input frequency (normal or Bypass AC input).
Load	Devices or systems connected to the UPS output.
Normal (double conversion) mode	The normal UPS operating mode in which the AC source supplies the UPS which in turn supplies the connected loads (after electronic double conversion).
Normal AC source	Normal source of power for the UPS.
PFC	Sinusoidal input module used to eliminate the harmonics reinjected by the UPS upstream.
Relay contacts	Contacts supplying information to the user in the form of signals.
Uin	UPS input voltage (normal or Bypass AC input).
Uout	UPS output voltage.
UPS	Uninterruptible Power Supply.